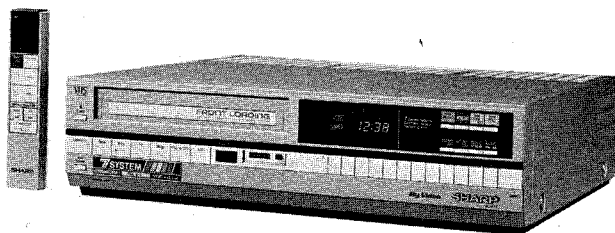


SHARP SERVICE MANUAL

S54Q2VC-477E/


VHS VIDEO CASSETTE RECORDER
MODEL VC-477E

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

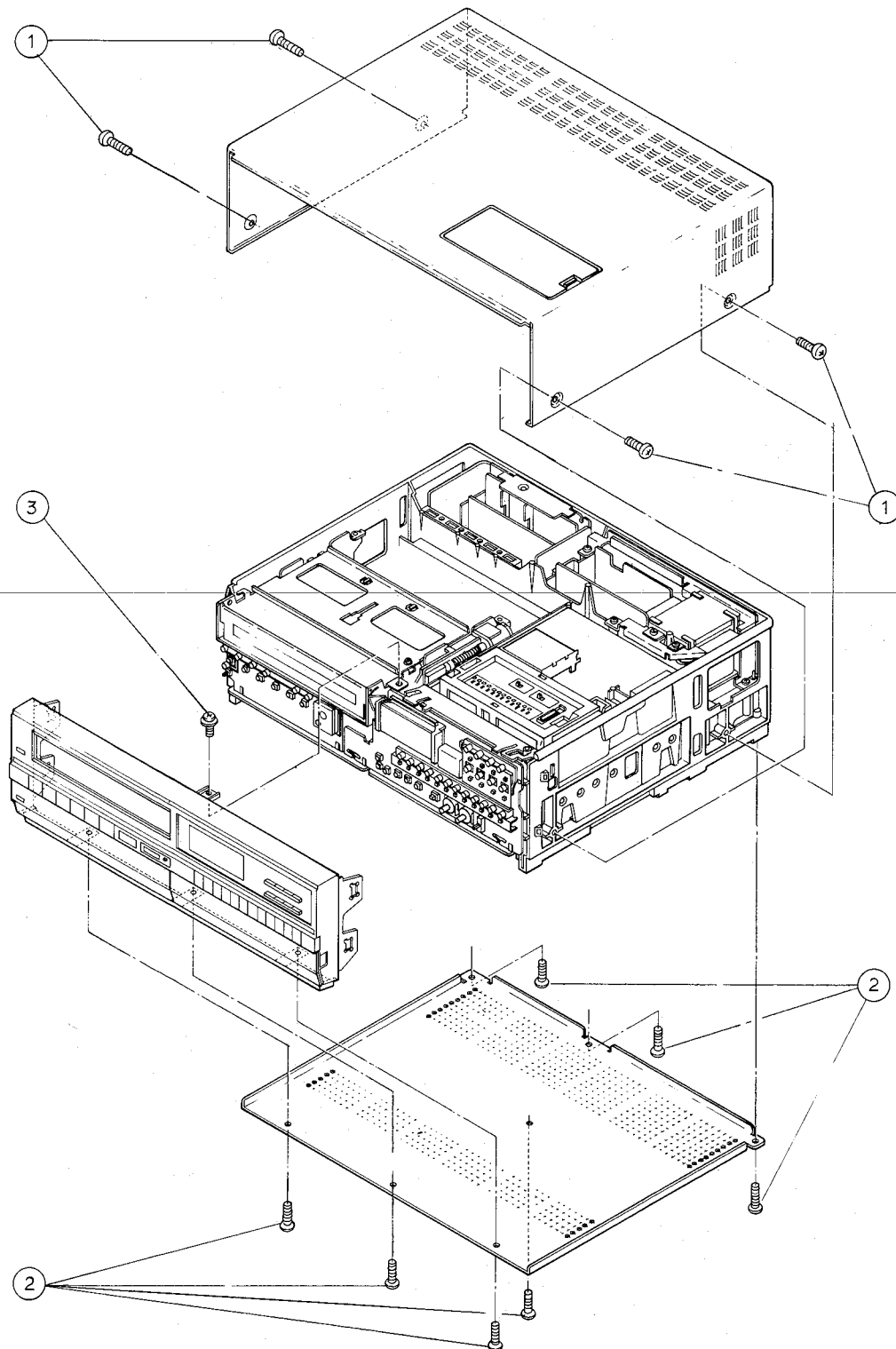
SPECIFICATIONS

Format:	VHS PAL/ME SECAM NTSC standard
Video recording system:	Two rotary head helical scan system
Luminance:	FM recording
Color signal:	Low frequency converted direct recording.
Video signal:	PAL ME SECAM NTSC 3.58, NTSC4.43. DISK50, DISK60
Recording/playing time:	4 hours max. with SHARP E-240 tape
Tape width:	12.7 mm
Tape speed:	23.39/33.34 mm/sec.
Antenna:	75 ohm unbalanced
Receiving channels:	VHF US2 — US13 E2 — E12 J1 — J12 UHF US14 — US83 E21 — E69 J13 — J62
RF converter output signal:	UHF channel 30 to 39 adjustable
Power requirement:	AC 110/127/220/240/260 V, AUTO. 50/60 Hz
Power consumption:	Approx. 38 W (with anti-dew heater)
Operating temperature:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	10.5 kg
Dimensions:	430 mm (W) x 370 mm (D) x 117 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	
Input:	0 dB = 0.775 Vrms
Output:	Line: -20 dB, more than 50 k ohm Line: -5 dB, less than 1 k ohm
ACCESSORIES INCLUDED:	Antenna 75 ohm coaxial connector cable (plug provided) Owner's Manual

* As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169-2) for combined VHF/UHF antenna with 75 ohm connector.

[1] REMOVAL OF MAIN PARTS

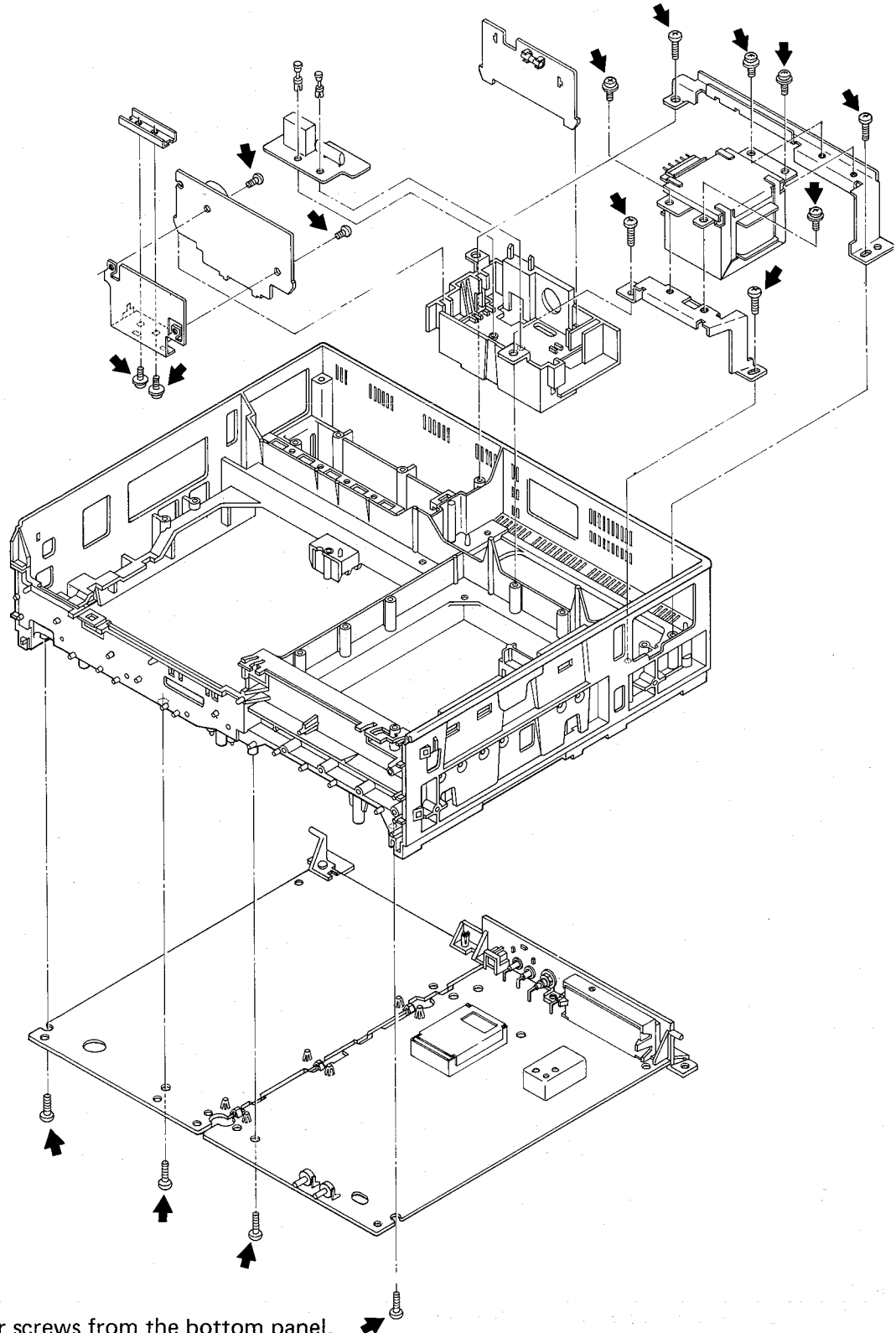


● Cabinet Removal

- ① Remove the four screws from the top panel.
- ② Remove the seven screws from the bottom panel.
- ③ Remove the one screw fixing the panel and take the panel off.

■ Printed Circuit Board Removal

Remove the each screw from the power circuit board.



Remove the four screws from the bottom panel. ➔

[2] MECHANICAL PARTS-LIST AND LAYOUT

● Top view

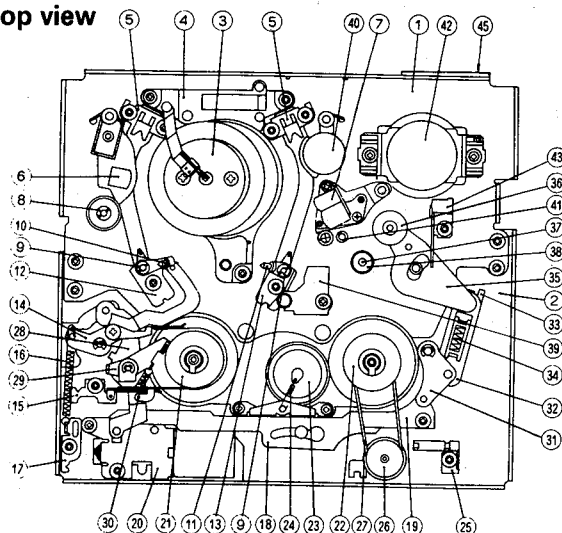


Figure 3.

● Bottom view

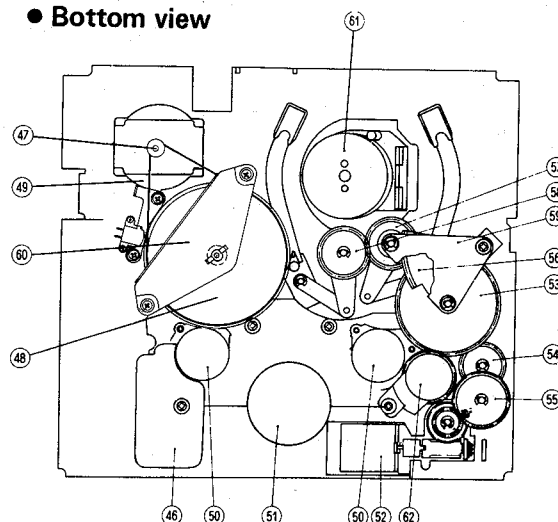


Figure 4.

No.	Description	No.	Description
1	A-chassis	33	Pinch roller double-action lever L
2	B-chassis	34	Pinch roller pressure spring
3	Drum	35	Pinch roller lever
4	V-base	36	Pinch roller
5	V-block (T/S)	37	Captan shaft
6	FE head	38	Capstan holder
7	AC head	39	LED holder
8	SI roller	40	TI roller
9	Guide roller (T/S)	41	Fixed guide
10	S-slant pole	42	Capstan motor
11	T-slant pole	43	Open angle
12	Pole base A	44	_____
13	Pole base B	45	Mechanism platform A
14	Tension arm	46	Mechanism platform B
15	Tension band assembly	47	Capstan pulley
16	Tension arm spring	48	Capstan flywheel
17	Tension arm spring angle	49	Capstan belt
18	Shifter	50	Reel brake unit
19	Shifter adjustment	51	Reel motor
20	Loading block	52	L motor
21	Supply reel disk	53	Master cam
22	Take-up reel disk	54	Tension arm escape cam
23	Reel idler	55	L intermediate gear
24	Reel idler spring	56	Segment gear
25	Cassette down SW	57	Loading gear A
26	Counter platform pulley	58	Loading gear B
27	Counter belt A	59	Loading gear plate
28	Shifter arm	60	F, W angle
29	Auxiliary brake	61	Drum DD motor
30	Auxiliary brake spring	62	Mechanical position switch
31	Pinch roller drive lever	63	FG Head
32	Pinch roller double-action lever U	64	FG Head Base

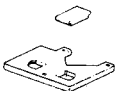



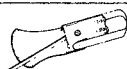
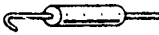




[3] ADJUSTMENT, REPLACEMENT, ASSEMBLING AND CLEANING OF THE MECHANICAL UNITS

Here we will describe a relatively simpler service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or

replacement, for example). We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original efficient condition.

● TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are recommended for proper service and satisfactorily repair.

	Jig Item	Parts No.	Configuration	Remarks
1	Master Plane and Reel Disk Height Adjusting	JiGMA0001		This jig is used for checking and adjusting the relative mechanical heights between Reel Disk and Stay.
2	Guide Pole Height Adjusting Jig.	JiGGH0110		This jig is used for adjusting the height of the running tape of the Video Head.
3	Torque Gauge	JiGTG1200		These jigs are used for checking and adjusting the torque of Take Up/Supply Reel.
	Torque Gauge	JiGTG0090		
4	Gauge Head	JiGTH0006		
5	Tension Gauge (300g)	JiGSG0300		There are several Gauges used for the tension measurements, and required 300g and 5.0 kg.
	Tension Gauge (5.0 kg)	JiGSG5000		
6	Hex Wrench (0.9 mm)	JiGHW0009		There jigs are used for locking or tightening special Hexagon type screws.
	Hex Wrench (1.2 mm)	JiGHW0012		
	Hex Wrench (1.5 mm)	JiGHW0015		
7	Alignment Tape (PAL)	VROCPSV		This tape is especially used for electrical fine adjustment.
8	Drum Replacement Jig	JiGDT-0001		These jigs are used for the replacement of VCR's upper drum.
9	DD Roter Ass'y Setting Jig	JiGGAST200		This jig is used for the replacement of the D.D. Motor.

Use of tools other than those listed will make the repair work lengthy and a matter of trial and error, with the likelihood of unsatisfactory results. These tools will be required frequently, so be sure to follow the instructions in this manual throughout the repair, adjustment and checking processes.

● PREVENTATIVE CHECKS AND SERVICE INTERVALS

The following intervals for servicing and checks should be observed in order to maintain the high quality of the mechanical components.

The time elapsed Part Name	500 hours	1,000 hours	1,500 hours	2,000 hours	3,000 hours	Notes
Guide Roller Ass'y	□	□	□	□	□	Replace in the event of irregularities such as (substantial) rotation and wobbling.
S.I. Roller	□	□	□	□	□	
S.I. Roller Inner		□		□	□	Clean with industrial methyl alcohol.
S.I. Roller Flange A	□	□	□	□	□	Clean those parts in contact with the tape. Use only specified cleaning liquid.
S.I. Roller Flange B	□	□	□	□	□	
T.I. Roller	□	□	□	□	□	
Stationary Guide	□	□	□	□	□	
Guide Flange B	□	□	□	□	□	
Slant Pole	□	□	□	□	□	
Video Heads	□	○ □	□	○ □	○ □	Clean parts in contact with the tape. Use only specified cleaning liquid.
F.E. Head	□	□	□	□	□	
A.C. Head	□	□	□	□	□	
Capstan Belt		□		○		Clean rubber parts and parts in contact with them. Use only specified cleaning liquid.
Counter Belt				○		
Pinch Roller	□	□	□	□	○ □	
Reel Idler	□	□	□	□	○ □	
Reel Motor Pulley	□	□	□	□	□	Clean those parts in contact with rubber.
Reel Motor				○		
Capstan Motor				○		
Loading Motor				○		
Supply & Take-up Disk		□ △		□ △		Clean with industrial methyl alcohol.
Tension Band Ass'y					○	
Brake Unit			○			

○ ... Replace □ ... Clean △ ... Oil

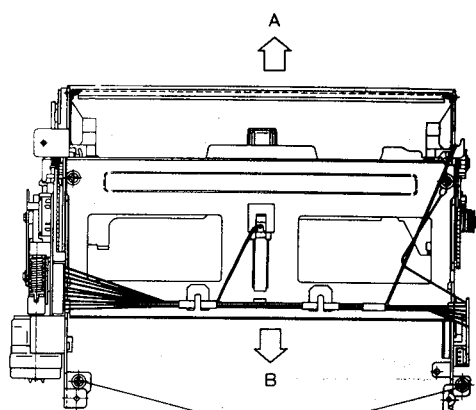
REMOVING AND FITTING THE CASSETTE HOUSING

● Removal

- 1) Open the cassette housing and take out the cassette.
- 2) Remove the connection on the right of the cassette housing. (Be careful not to cut the lead wire.)
- 3) Remove the two screws fixing the cassette housing.
- 4) Slide the cassette housing in the direction of the arrow (in Fig. 5) and lift straight up to remove.

Notes:

- 1) Be careful not to knock the nearby guide pins or the drum when removing or fitting the cassette cover.
- 2) Remove the power plug from the socket before commencing removal or fitting.



Cassette Housing Fixing Screws
(XHPS330P06WS0) x 2

Figure 5.

● Fitting

- 1) Connect the connector at the right side of the cassette housing.
- 2) Insert the catch of the cassette housing in the mechanical chassis B and slide in the direction of the arrow B (in Fig. 5) to fix temporarily.
- 3) Confirm that the cassette housing is in the prescribed position and fix with 2 x (XHPS330-P06WS0) screws.
- 4) Arrange the lead wire for the connector on the right hand side of the cassette housing.

WHEN RUNNING TAPE WITHOUT CASSETTE HOUSING PLACED

- 1) Open the lid of the video cassette tape and fasten it with PVC tape.
- 2) Load the video cassette tape in position in the transport. Place a weight (of some 500g) on it to prevent it from moving up.

Note: Do not use a weight heavier than 500g.

REEL DISK REPLACEMENT AND HEIGHT ADJUSTMENT

● Removal

(Supply reel disk)

- 1) Remove the tension band ⑦.
- 2) Remove the slit washer ①.
- 3) Remove the clearance adjustment washer ②.
- 4) Lift the supply reel disk ③ upwards to remove, and replace.

(Take-up reel disk)

- 1) Remove the counter belt ⑥.
- 2) Remove the slit washer ①.
- 3) Remove the clearance adjustment washer ②.
- 4) Lift the take-up reel disk ④ upwards to remove, and replace.

Notes:

- 1) Always adjust the reel disk height when fitting.
- 2) Take care not to deform the tension band when fitting and removing.
- 3) Take care not to deform the auxiliary brake bar.
- 4) Check and adjust the tension pole positions.
- 5) The supply reel disk is intended to engage the teeth on the reel unit slip plate. Rotate the reel gently by hand when assembling.

* When the height adjustment washers ⑤ are removed, they should also be cleaned.

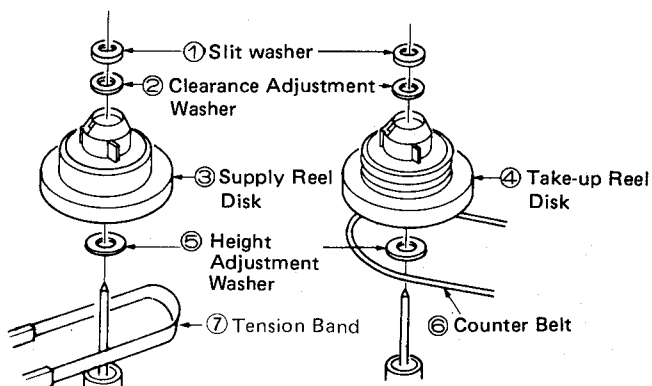


Figure 6.

● Reassembly

(Supply Reel Disk)

- 1) Clean the reel disk shaft and fit the height adjustment washer ⑤.
- 2) Fit the replacement supply reel disk.
- 3) Adjust the reel height by means of the master plane and the reel height adjustment jig.
- 4) Remove the replacement supply reel disk and oil the reel shaft, and then refit the replacement supply reel disk.
- 5) Fit the clearance adjustment washer ②. (The reel disk thrust play should be 0.1 to 0.5mm.)
- 6) Fit the slit washer ①.

- 7) Fit the tension band ⑦.

(Take-up Reel Disk)

- 1) Clean the reel disk shaft and fit the height adjustment washer ⑤.
- 2) Fit the replacement take-up reel disk.
- 3) Adjust the reel height by means of the master plane and a reel height adjustment jig.
- 4) Remove the replacement take-up reel disk and oil the reel shaft, and then refit the replacement take-up reel disk.
- 5) Fit the clearance adjustment washer ②. (The reel disk thrust play should be 0.1 to 0.5 mm.)
- 6) Fit the slit washer ①.
- 7) Fit the counter belt ⑥.

Notes:

- 1) When removing and fitting, take care not to damage the reel disk shaft with the slit washer or tools.
- 2) After fitting, adjust the VS back tension.
- 3) The take-up reel disk is intended to engage the reeth on the reel unit slip plate. Rotate the reel gently by hand when assembling.

HEIGHT CHECKING AND ADJUSTMENT

- 1) Remove the cassette housing and set the master plane in the mechanism as shown in figure 7 (a), taking care not to touch the drum.
- 2) Check to see whether part A of the reel disk height adjustment jig in figure (b) is low and part B is high.
If they are not within the specified values, adjust the height with the height adjustment washer, so that vertical play is within 0.1 to 0.5 mm.

Note:

Always check and adjust the reel disk height when replacing the reel disks.

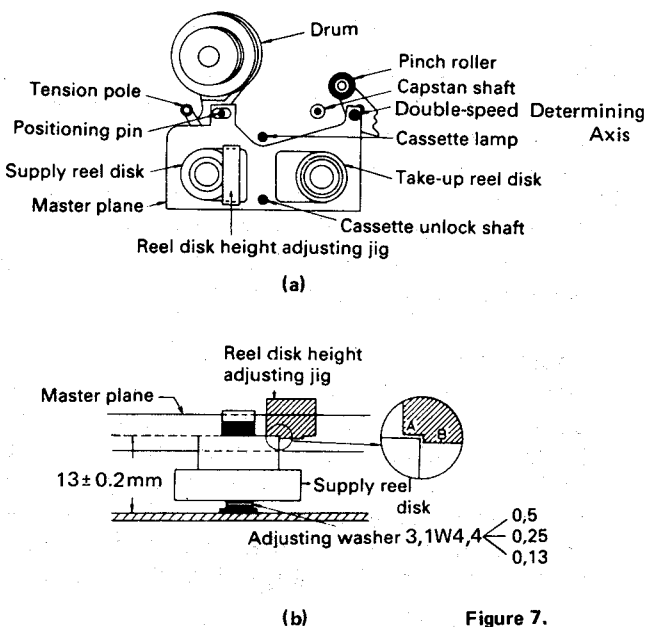


Figure 7.

FAST FORWARD TAKE-UP TORQUE CHECKING AND ADJUSTMENT

Notes:

- 1) Take care that the torque gauge does not fly off when setting the torque gauge on the reel disk and pressing the FF button to start the reel disk turning.
- 2) The checking and adjustment should be carried out without a video cassette tape in place.

● Checking

- 1) Remove the cassette housing, and hold the cassette down button down with adhesive tape.
- 2) Set the torque gauge on the take-up reel disk and press the FF button to enter the FF mode.
- 3) Rotate the torque gauge slowly (about one turn in 2 to 3 seconds) by hand in the take-up direction, checking that there is no slippage between the reel idler, reel motor pulley, and the take-up reel disk with a torque of 800g.cm. or more.

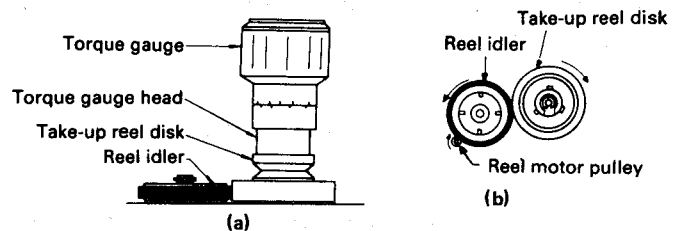


Figure 8.

● Adjustment

If the FF take-up torque is outside the specified values, clean the reel motor pulley, the reel idler, and the take-up reel disk with cleaning fluid, and re-check.

REWIND TAKE-UP TORQUE CHECKING AND ADJUSTMENT

Notes:

- 1) When setting the torque gauge on the reel disk and pressing the REW button to start the reel disk turning, take care that the torque gauge does not fly off.
- 2) The checking and adjustment should be carried out without a video cassette tape in place.

● Checking

- 1) Remove the cassette housing and hold the cassette down button down with adhesive tape.
- 2) Set the torque gauge on the supply reel disk and press the REW button to enter the REW mode.

- 3) Rotate the torque gauge slowly (about one turn in 2 to 3 seconds) by hand in the direction of rewind take-up, checking that there is no slippage between the reel idler, the reel motor pulley and the supply reel disk with a torque of 800 g.cm. or more.

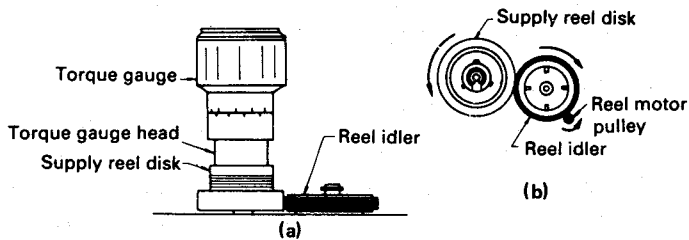


Figure 9.

● Adjustment

Clean the reel motor pulley, the reel idler, and the supply reel disk with cleaning fluid, and re-check if the REW take-up torque is outside the specified values.

CHECKING THE TAKE-UP TORQUE

● Checking

- 1) Remove the cassette housing and hold the CASSETTE DOWN button down with adhesive tape.
- 2) Set a torque gauge to the take-up reel disk and rotate it in a clockwise direction once for every 9 seconds and check that the torque is within the specified range.

Set value: 170 ± 15 g.cm
(In the case of PAL/SECAM)
 170 ± 15 g.cm
(In the case of NTSC)

Note:

The take-up torque varies with the revolution torque of the motor and so the average value must be taken for the set value.

● Adjustment

Clean the reel motor pulley, the reel idler and the supply reel disk with cleaning fluid and re-check if the PLAY-BACK take-up torque is outside the specified values.

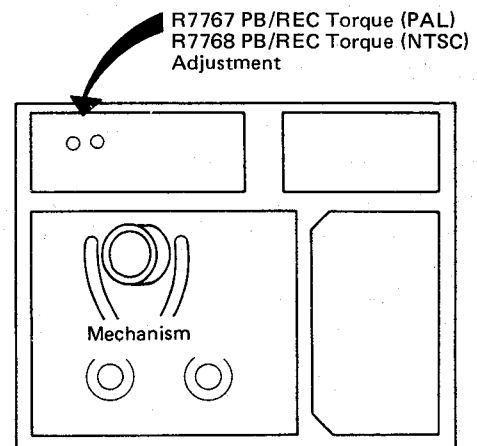


Figure 10.

CHECKING THE FAST FORWARD BACK TENSION

Note:

Measure after confirming that the reel gauge is securely set on the reel disk. Measurements cannot be performed if the torque gauge floats away from the reel disk.

● Checking

- 1) Remove the cassette housing and hold the cassette-down button down with adhesive tape.
- 2) Press the FF button to enter the FF mode.
- 3) Put the torque gauge on the supply reel disk and slowly rotate it to the right (1 turn every 2 to 3 seconds) and check that the torque is within the specified range (10 g.cm. to 20 g.cm.)

CHECKING THE REWIND BACK TENSION

Notes:

- 1) Measure after confirming that the reel gauge is securely set on the reel disk. Measurements cannot be performed if the torque gauge floats away from the reel disk.
- 2) The REWIND back-tension is the same as that for the VS-REW and therefore need not be checked if the check for the VS-REW back-tension has already been performed.

● Checking

- 1) Remove the cassette housing and hold the cassette-down button down with adhesive tape.
- 2) Press the REW button to enter the REW mode.
- 3) Put the torque gauge on the take-up reel disk and slowly rotate it to the left (1 turn every 2 to 3 seconds) and check that the torque is within the specified range (less than 15 g.cm.).

CHECKING THE BACK TENSION IN FWD

(Forward Video Search)

Notes:

- 1) Check and adjust the VS-FWD back tension after adjusting the position of the tension arm.
- 2) Make the measurement with the torque gauge securely on the supply reel disk. It will not be possible to obtain an accurate reading if the torque gauge is not secure.
- 3) Adjust the auxiliary brake spring and recheck if the VS-FF back tension is not within the specified values (10 ~ 20 g.cm.).

● Checking

- 1) Remove the cassette housing.
- 2) Hold the cassette-down button down with adhesive tape.
- 3) Press the PLAY button to enter the PLAY-BACK mode.
- 4) Press the VS-FF button to enter the VS-FF mode and check that the auxiliary brake is acting on the supply reel disk.
- 5) Measure the torque by putting the torque gauge on the supply reel disk and rotating it slowly (1 turn every 2 to 3 seconds), checking that the torque is within the specified values (10 ~ 20 g.cm.).

CHECKING THE BACK TENSION IN VS-REW

(Reverse Video Search)

Note:

Make the measurement with the torque gauge securely on the take-up reel disk. It will not be possible to obtain an accurate reading if the torque gauge is not secure.

● Checking

- 1) Remove the cassette housing.
- 2) Hold the cassette-down button down with adhesive tape.
- 3) Press the PLAY button to enter the PLAY-BACK mode.
- 4) Press the VS-REW button to enter the VS-REW mode.
- 5) Measure the torque by placing the torque gauge on the take-up reel disk and rotating it slowly (1 turn every 2 to 3 seconds), checking that the torque is within the specified values (Less than 15 g.cm.).

CHECKING THE PINCH ROLLER ENGAGEMENT FORCE

- 1) Remove the cassette housing and hold the cassette-down button down with adhesive tape.

- 2) Press the PLAY button to enter the PLAY mode.
- 3) Pull the pinch roller in the direction opposite to the direction of engagement (arrow A) and separate the pinch roller from the capstan.
- 4) Then, gradually return the pinch roller (arrow B) and measure the tension when the pinch roller contacts the capstan. Make the measurement when the hall (a) is being pulled only by stick type tension gauge.
- 5) Check that the measure value is within the specified values. (1480 to 1870 g.cm.).

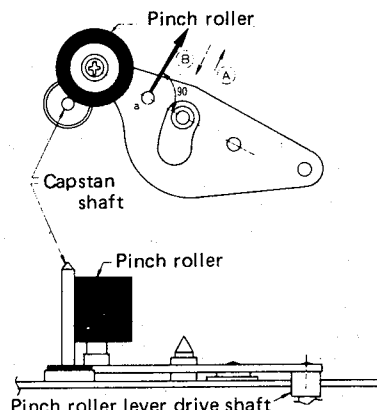


Figure 11.

ADJUSTMENT AND CHECKING OF THE GAP BETWEEN THE CAPSTAN AND PINCH ROLLER WITH IN PAUSE IN THE RECORDING MODE.

● Checking

- 1) Remove the cassette housing.
- 2) Hold the cassette-down button down with adhesive tape.
- 3) Press the REC button to enter the REC mode.
- 4) Press the PAUSE button to enter the PAUSE mode.
- 5) Visually check that the gap between the pinch roller and capstan in this state is in the specified range (0.5 ~ 0.9 mm).

Note:

Assembly Edit is incorporated, so it takes 2 to 3 seconds for the Pause mode to be entered.

● Adjustment

- 1) If the gap between the pinch roller and the capstan is not within the specified range, loosen the screws (XBPSD30P05JS0), securing shifters A and B and adjust.
- 2) After adjustment, paint the screws (XBPSD-30P05JS0) with locking paint.

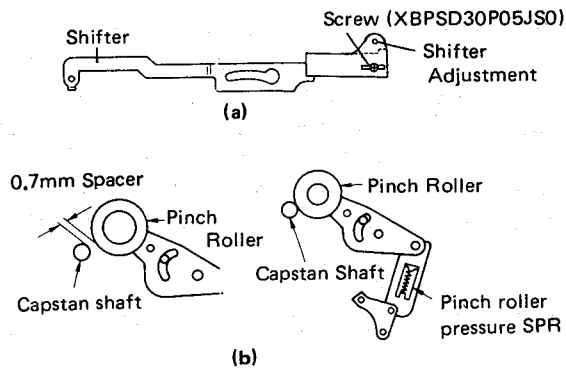


Figure 12.

CHECKING PROCEDURE OF REEL IDLER PRESSURE

- 1) Remove the cassette housing.
- 2) Move the reel idler to the center as shown in figure 13.
- 3) Push the reel idler in the direction of the arrow (A) in figure 13, with the tension gauge, until it separates from the reel motor pulley.
- 4) Gradually return the reel idler in the direction of the arrow (B) in figure 13 and check that the value on the tension gauge at the moment the reel idler contacts the reel motor pulley, is within the specified range (120 to 170 g.).

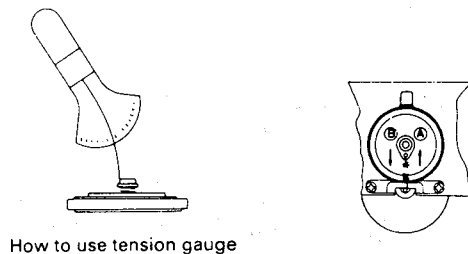


Figure 13.

CHECKING AND ADJUSTING THE TENSION POLE POSITION

• Position Checking

- 1) Remove the cassette housing.
- 2) Load a video cassette and press the PLAY button to enter the PLAY mode.
- 3) At the same time, the pole bases A and B draw the tape from inside the cassette, the tension pole moves to the left, and loading begins. Check the position of the tension pole in this state.
- 4) Visually check that towards the end of the tape (E-180) enter of the tension pole is posi-

tioned 1.25 to 1.75 mm to the left of the center of the SI roller.

- 5) Check to see that the video tape is not curling or riding up onto the SI roller flange.
- 6) Check that the tension band is disengaged from the reel disk in video search.

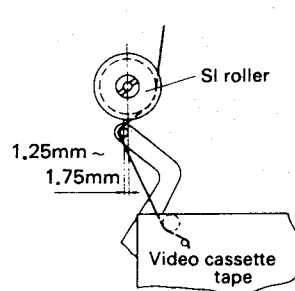


Figure 14.

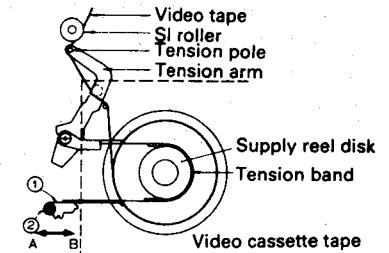


Figure 15.

• Position Adjustment

- 1) When the position of the tension pole is less than 1.25 mm to the left of the center of the SI roller, move the tension band adjustment angle (1) in the direction of the arrow B in figure 15 and tighten the screw.
- 2) Where the position of the tension pole is more than 1 mm to the left of the center of the SI roller, move the tension band adjustment angle (1) in the direction of the arrow A in figure 15 and tighten the screw.

Notes:

- 1) After adjustment, secure the screws with locking paint.
- 2) Do not overtighten the screws as this may damage the screw mounds on the chassis.

CHECKING AND ADJUSTING TENSION POLE VERTICALITY

• Checking Verticality

- 1) Remove the cassette housing and hold the cassette-down button down with adhesive tape.
- 2) Set the stationary guide height adjustment jig as shown in Figure 16.
- 3) Check the verticality of the tension pole in this state.

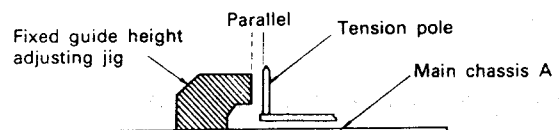


Figure 16.

CHECKING THE BACK TENSION DURING RECORD AND PLAY

• Checking

1. Using a Back Tension Measurement Cassette

- 1) Remove the cassette housing and hold the cassette-down button down with adhesive tape.
- 2) Load the back tension measurement cassette.
- 3) Press the PLAY button to enter the PLAY mode. Check on the indicator needle of the back tension measurement cassette that the back tension is within the set values (50 to 57 g.cm.)
- 4) Check that the video tape is wound round the stationary guide.
- 5) Check that no tape slack is produced and no damage is caused to the edges of the tape, from the beginning to the end of the tape.

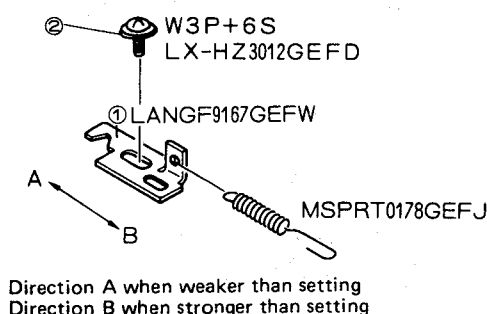


Figure 17.

CHECKING THE REEL BRAKE TORQUE

1. Checking Supply Side Medium Braking

Notes:

- 1) Check medium braking before checking strong braking.
- 2) Measure within 10 seconds after plugging in the power cord, and return shorted parts.
- 3) Check the supply side medium braking torque in both the clockwise and counterclockwise directions of rotation.
- 4) The set value for the supply side medium braking torque is at least 100 g.cm. and at most 1/2 of the take-up side strong braking torque.

• Checking

- 1) Remove the cassette housing.
- 2) Remove the power cable and short-circuit the IC802 side of the resistor R843 on the system control board with the motor ground.
- 3) Separate the reel idler from the supply reel disk and set the torque gauge.
- 4) Plug in the power cord.

- 5) Slowly rotate the torque gauge (one turn every 2 to 3 seconds) and check that the supply side medium brake torque is at least 100 g.cm.

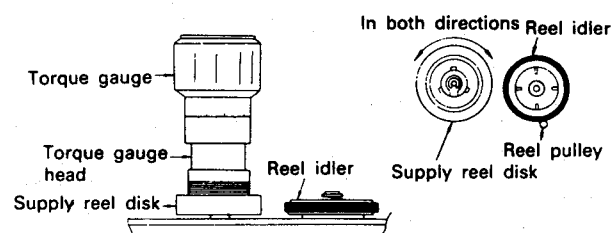


Figure 18.

2. Checking Take-up Side Medium Braking

Notes:

- 1) Check medium braking before checking strong braking.
- 2) Measure within 10 seconds after plugging in the power cord, and return shorted parts.
- 3) Check the take-up side medium braking torque in both the clockwise and counterclockwise direction of rotation.
- 4) The set value of the take-up side medium braking torque is at least 100 g.cm. and at most 1/2 of the supply side strong braking torque.

• Checking

- 1) Remove the cassette housing.
- 2) Remove the power cable before connecting the IC802 side of the resistor R844 on the system control board to the motor ground.
- 3) Separate the reel idler from the take-up reel disk and set the torque gauge.
- 4) Plug in the power cord.
- 5) Slowly rotate the torque gauge (one turn every 2 to 3 seconds) and check that the take-up side medium brake torque is at least 100 g.cm.

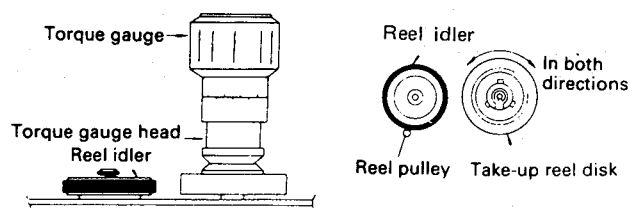


Figure 19.

3. Checking the Supply Side Strong Braking

Notes:

- 1) Measure within 10 seconds after plugging the power cord, and return the shorted parts.
- 2) Measure the strong braking after measuring the medium braking.

- **Checking**

- 1) Remove the cassette housing.
- 2) Remove the power cable before connecting the Q813 side of the resistor R843 on the system control board to the motor ground.
- 3) Separate the reel idler from the supply reel disk, and set the torque gauge.
- 4) Plug in the power cord.
- 5) Slowly rotate the torque gauge in the clockwise direction (one turn every 2 to 3 seconds), and check that the supply side strong braking torque is at least 300 g.cm. and that it is at least twice the take-up side medium braking torque.

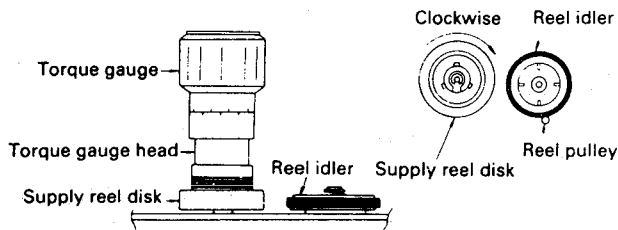


Figure 20.

4. Checking the Take-up Side Strong Braking

Notes:

- 1) Measure within 10 seconds after plugging the power cord, and return the shorted parts.
- 2) Measure the strong braking after measuring the medium braking.

- **Checking**

- 1) Remove the cassette housing.
- 2) Remove the power cable before connecting the Q802 side of the resistor R844 on the system control board to the motor ground.
- 3) Separate the reel idler from the take-up reel disk, and set the torque gauge.
- 4) Plug in the power cord.
- 5) Slowly rotate the torque gauge in the counter-clockwise direction (one turn every 2 to 3 seconds), and check that the take-up side strong braking torque is at least 300 g.cm. and that it is at least twice the supply side medium braking torque.

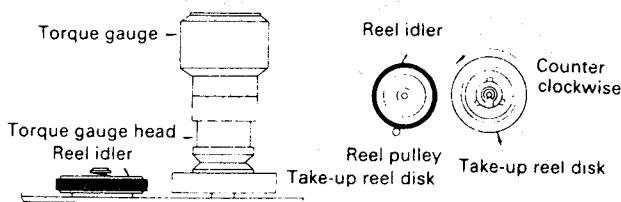


Figure 21.

CHECKING AND ADJUSTMENT OF S.I. ROLLER/STATIONARY GUIDE HEIGHT

- **Checking**

- 1) Check that the edge of the video tape does not fold or crease, as shown in figure 22, during the travel of the tape.

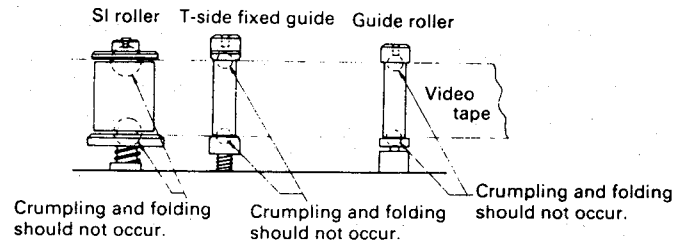


Figure 22.

- **Adjustment**

The following adjustments should only be made where misalignment has been positively identified.

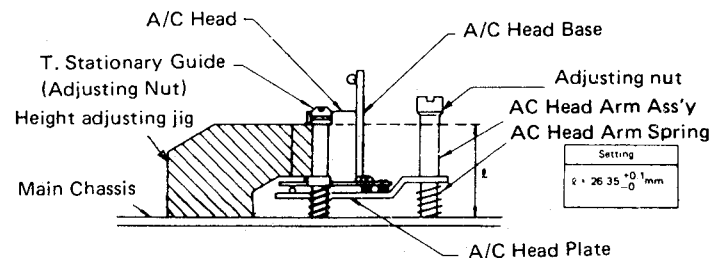


Figure 23.

- 1) Set the guide height adjustment jig on the main chassis A, as shown in figure 23.
- 2) Slowly turn the nuts of the stationary guide and the upper portion of the SI roller with a flat-bladed screwdriver, and adjust the height to $l = 26.35^{+0.1}_{-0}$ mm.

Notes:

- 1) After adjustment, check the result by running a video tape.
- 2) After adjustment is complete, always adjust the tape travel, and adjust the T and S guide rollers before carrying out the checks in figure 22.
 - Do not move the nuts once the adjustment has been completed.

REPLACEMENT OF THE AC HEAD

Note:

After completing the replacement, always check the tape travel path adjustment. When replacing the heads, never touch the head surface.

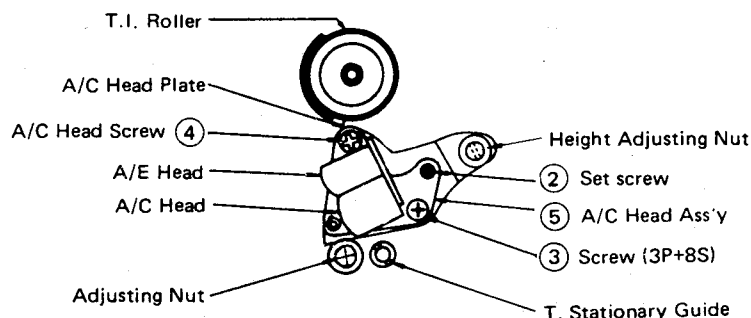


Figure 24.

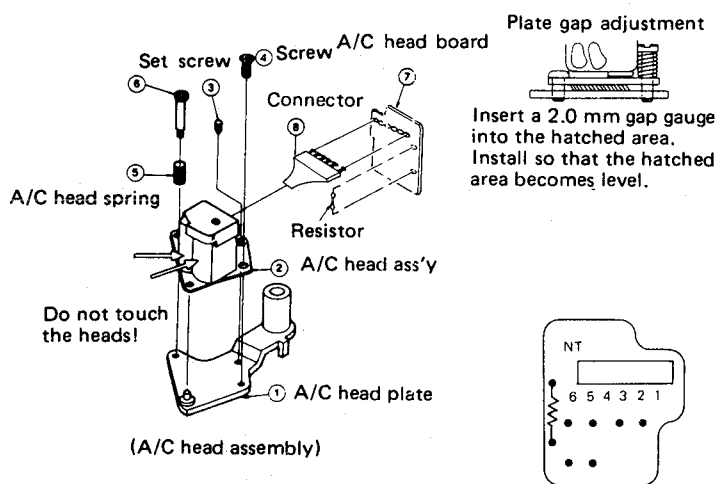


Figure 25.

● Replacement

- 1) Unsolder the leads joined to the AC head board and remove the leads from the board.
- 2) Undo the setscrews (2) with a hexagonal wrench.
- 3) Remove the screw (3) (3P + 8S) with a Philips screwdriver.
- 4) Undo the AC head screw with a Philips screwdriver. Care is needed at this stage as there is a spring inserted between the plate and the AC head screw (4).
- 5) Remove and replace the AC head board affixed to the AC head assembly.
- 6) It is best to replace the whole entire head when exchanging the AC head head Ass'y (5).

AC HEAD HEIGHT AND TILT CHECKING AND ADJUSTMENT

● Checking

- 1) Select the PLAY mode with a 180 minute tape loaded.

- 2) Check that the tape is not curling on the flanges of the T. station.
- 3) Check that the AC head has a height and tilt with regard to the tape as shown in Fig. 26.

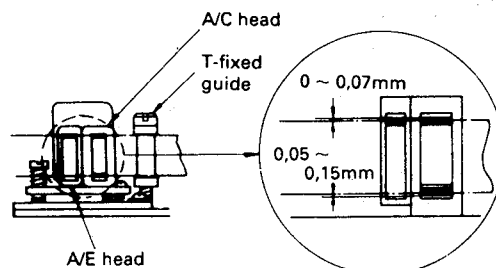


Figure 26.

● Adjustment

1. Carry out the following adjustments with reference to figures 24 and 26, if an abnormality can be seen in the travel mode.
 - 1) Put the machine into the PLAY mode with a 180 minute tape, to check the travel.
 - 2) Check that the tape moves cleanly and smoothly, and remains completely flat as it travels from the guide roller to the T. impedance roller, from the T. impedance roller to the T. stationary guide, and from the T. stationary guide to the capstan shaft.
 - 3) If the tape is slightly misaligned between the AC head and the T. stationary guide it will be absolutely impossible to achieve a satisfactory picture, so check that the tape does not ride up on the flanges of the T. stationary guide producing small creases.
 - 4) If adjustment is needed, adjust by means of the setscrews (2) in figure 24). Turn the screw (2) slightly.
N.B. Do not move the T. Stationary guide.
 - 5) The height of the AC head should be positioned with regard to the tape as shown in figure 27.
2. Once tape travels smoothly around the AC head, and the height has been roughly adjusted, next use an alignment tape for fine head height and azimuth adjustment.
 - 1) Play the 1 kHz audio signal on the alignment tape (the video image will be color bars), and measure the audio board, on an oscilloscope.
 - 2) Turn the setscrew (2) and the screw (3) slightly to achieve the maximum level, and at the same time, adjust for the minimum level variation.

- 3) Reproduce the 7 kHz audio signal on the alignment tape (the video is a stepped wave), and measure the audio board, on an oscilloscope.
- 4) Adjust the azimuth adjustment screw (3) (3P+8S) for the maximum audio level.
- 5) Recheck the tape travel adjustment.

TAPE TRAVEL ADJUSTMENT

- 1) Adjust and check the height of the reel disks with the master plane and the reel height adjustment jig.
- 2) Check and adjust the height of the SI rollers and the stationary guides, using the stationary guide height adjustment jig.
- 3) Check the position and verticality of the tension of the tension poles, using a tension pole position adjustment jig.
- 4) Set a rough adjustment tape in PLAY, and carry out rough adjustment of the height of the guide rollers with a flat-bladed screwdriver, so the lower edge of the tape lies along the drum's lead.

Also, check that the video tape does not curl on the flanges of the T and S guide rollers.

- 5) Play a standard tape and finely adjust the height of the guide rollers so that the envelope is flat, and is not excessively adversely affected even when the tracking knobs are rotated. Also, adjust the switching point to $6.5H \pm 0.5H$.
- 6) Adjust the height, tilt and azimuth of the AC head.
- 7) Turn the tracking knob to its preset position and turn the adjusting nut (in Fig. 24) so that the envelope is at a maximum before performing adjustment of the AC head.
- 8) Make a recording on a standard tape to check the flatness of the envelope and sound reproduction.
- 9) After adjustment, all the adjusting screws and nuts, etc., should be secured in place by a coating of locking paint.

UPPER DRUM REPLACEMENT

Caution:

The fit of the external surface of the disk with the internal surface of the upper drum is in the order of a few microns and so fitting will be difficult to perform if there are any scratches or dirt specks present and there is a possibility that there will be an influence upon the accuracy of fitting. Extra caution should therefore be paid when replacing.

● Replacement

- 1) Use a Philips-head screwdriver to remove the two brass (3P+4S) fixing screws (6).
- 2) Remove the V-H: lead shield cap (7).
- 3) Remove the lead wires when removing the solder from leads (1) – (4).
- 4) Use a Philips-head screwdriver to remove the two flat brass (W3P+9S) washer screws.
- 5) Remove the upper drum by lifting straight up so that it does not incline and perform replacement without damaging the outer surface of the disk.

Note:

- 1) Do not touch the surface of the drum.
- 2) Insert the screwdriver and tighten the screw gently.

● Assembly

- 1) Fit a replacement drum as shown in figure 27, taking care to correctly position the respective leads.

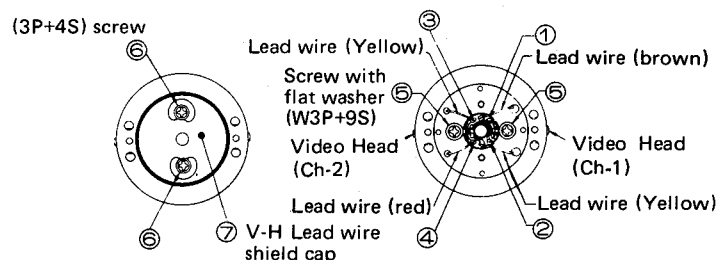


Figure 27.

Notes:

- 1) Before setting, check that there are no scratches or dirt on the edges or outer surface of the disk.
- 2) Before setting, check that there are no scratches or dirt on the edges or inner surface of the upper drum.
- 3) When setting, insert the upper drum slowly so that it does not incline towards the disk.
- 4) When setting, take care to prevent dust and rubbish entering between the disk and the upper drum.
- 5) Insert the screwdriver and tighten the screw gently.
 1. Fix the upper drum with the two screws (5).
 2. Solder the leads (1) – (4) in their specified position.
 3. Fix the V-H lead wire shield cup (7) with screw (6). Tighten the screw gently.
 4. When the replacement is complete, check the tape travel and then make an electrical test.

- (1) Adjust the playback switching point.
- (2) Adjust the recording switching point.
- (3) Check the tracking preset.
- (4) Check the tracking volume.
- (5) Check the head resonance and head Q.
- (6) Check the FM channel balance.

Note:

Carry out the soldering in a short time and do not contact the adjacent pattern.

GUIDE ROLLER ADJUSTMENT

● Video Tape Setting

- 1) Remove the upper cabinet.
- 2) Place an alignment cassette into the cassette housing.
- 3) Properly connect the power cord, monitor output cord and video input cord.
- 4) Connect Ch-1 of an oscilloscope to the RF envelope output. TP308 and Ch-2 to switching pulse TP309.
- 5) Press the PLAY button to enter the PLAY mode.

● Adjustment

- 1) The guide roller setscrews should be sufficiently tightened with a using the guide roller adjustment flat bladed screwdriver.
- 2) Trigger with a switch pulse and observe the envelope (figure 28).
- 3) Adjust the height of the guide rollers while watching the envelope, so that the tape runs along the drum lead. Whether the video tape is above or below the helical lead will be shown in the waveform represented by the envelopes in figures 29 and 30 respectively.

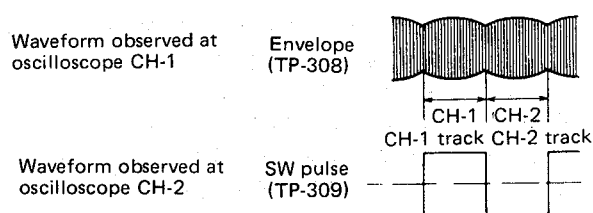


Figure 28.

a. Envelope waveforms where video tape is floating below the helical head position.

Tape-helical lead distance	Small	Medium	Large
Supply side (drum inlet)			
Take-up side (drum outlet)			

Figure 29.

b. Envelope waveforms where the video tape is too heavily suppressed to the helical lead position.

Tape-helical lead distance	Small	Medium	Large
Supply side (drum inlet)			
Take-up side (drum outlet)			

Figure 30.

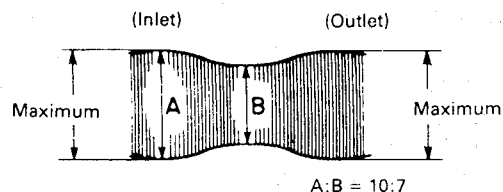


Figure 31.

- 4) Fine adjust the height of the guide roller while watching the envelope, to make the envelope flat. Adjust so that even altering the tracking controls has little ill effect on the flatness.
- 5) Adjust so that when the tracking control is moved from its normal position (the tracking control is moved and A of the RF waveform begins to decline) the ratio between A and B in figure 31 is better than A(10): B(7).
- 6) Perform adjustment of the PLAY-BACK SW point along with that for the PLAY-BACK SW point adjustment for electrical adjustment.
- 7) Record and play a color bar with a video tape to check that the envelope is flat.
- 8) After adjustment, the guide roller setscrews should be finally tightened.
- 9) After doing this, check the RF envelope again.

REEL UNIT REPLACEMENT

1. Reel Motor Replacement

● Removal

- 1) Remove the cassette housing.
- 2) Unsolder the leads on the reel motor terminals.
- 3) While supporting the reel motor from the rear of the chassis, remove the two screws ② (XBPSD26P06J00) that retain the reel motor, and then remove the motor. At this time, the reel idler ④ should be moved to the left or right to prevent it from falling out. At the same time, remove the spring hooking angle.

Notes:

- 1) Take care not to mix up the polarity when soldering the reel motor.
- 2) Use only the specified screws for mounting the reel motor as it may be damaged by unspecified ones.

- 3) The cassette-down switch holder has lead wires soldered to it so it cannot be removed even when the two retaining screws have been removed. Be careful not to break the lead wires with undue force.

● Fitting

- 1) Check that the reel idler ④ is securely attached to the reel chassis ① and that the reel idler engagement spring ⑤ is properly hooked on the reel idler.
- 2) While taking care not to damage the reel motor pulley ③, install a replacement reel motor with screws (XBPSD26P06J00) so that the reel motor terminal and spring hook angle are in the direction as shown in Fig. 32. (Use of longer screws will damage the motor.)
- 3) Solder the leads to the reel motor terminals.
- 4) Clean the reel motor, the reel idler, the supply reel disk and the take-up reel disk with the designated cleaning liquid.
- 5) Check the fast forward and rewind take-up torque and check and adjust the playback take-up torque.

2. Reel Idler Replacement

Note:

- 1) Replacing the reel idler can be carried out without unsoldering the reel motor leads. (Step 2 of 1 may be omitted) however, adequate care must be taken not to break the reel motor leads, and not to hit or damage the reel motor, the reel motor pulley, etc.

● Removal

- 1) Repeat steps 1 to 3 in 1 above referring to the removal of the reel motor.
- 2) Move the reel idler to the center of the reel chassis as shown in figure 32, and then pulley slightly to the reel motor side to remove the reel idler.

Notes:

- 1) Take care not to deform the reel idler spring.
- 2) Step 3 of 1 above may be omitted if the reel motor leads are not disconnected for the replacement operation.
- 3) Always check the take-up torques as in step 6 of the fitting operation even where only the reel idler is replaced.

● Fitting

- 1) Hook the reel idler engagement spring correctly on the idler, and assembled by fitting the reel idler onto the reel chassis.
- 2) Move the reel idler to the left or right.
- 3) Fit the reel motor by steps 1 to 5, Fitting of 1 above.

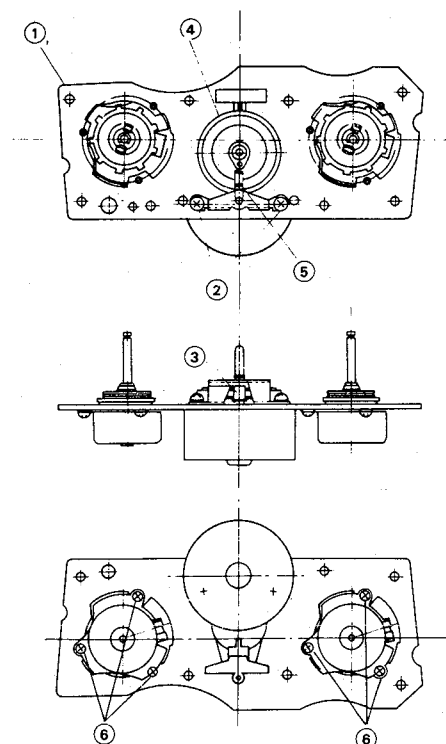


Figure 32.

3. Brake Unit Replacement

Notes:

- 1) Always check the reel disk height, the VS back tension and the fast forward back tension after replacing a brake unit.
- 2) When fitting or removing the reel disks, take care with regard to the matter mentioned in the note in subsection height checking and adjustment.
- 3) Use only the specified screws for mounting the brake units.
- **Removal (Remove both the supply and take-up side units by the following method)**
 - 1) Remove the reel disk.
 - 2) Remove the solder from the terminals of the brake unit of the take-up reel. These terminals are on the interrupt circuit board B at the rear of the chassis.
 - 3) Remove the fixing screw (XHPSD30P12WS0) of the interrupt circuit board B, then remove the interrupt circuit board B.
 - 4) Remove the three installation screw (6) (XBPS-D26P04000) of the brake unit. Then detach the brake unit.

Note:

Perform soldering for the terminals of the brake unit after the interrupt circuit board has been screwed back in place.

● Fitting

- 1) Fit the replacement brake unit in the direction

shown in Fig. 32 using the three (XBPSD26P-04000) screws.

- 2) Fit the interrupt circuit board with the (XHPSD-30P12WS0) screw.
- 3) Solder the terminals of the brake unit.
- 4) Fit the reel disk.
- 5) Re-check everything and then confirm the back-tension. (Only when replacing the supply side brake unit.)

CAPSTAN MOTOR REPLACEMENT

● Removal

- 1) Remove the capstan belt.
- 2) Remove the solder on the (two) motor leads from the mechanism circuit board A.
- 3) Remove the two cup tight screws (XHPSD30P-06WS0) and remove the capstan motor holder from chassis A.
- 4) Remove the three screws (XBPSD20P05J00) and remove the capstan motor from the capstan motor holder.

● Fitting

- 1) Fit the capstan motor to the capstan motor fitting board using the three (XBPSD20P05J00) screws.
- 2) Fit the chassis using the two (XHPSD30P-06WS0) cup tight screws.
Solder the leads to the terminals of the motor and insert in the wire holder.
- 3) Solder the motor leads to the mechanism interrupt circuit board.
- 4) Fit the capstan belt after cleaning it as well as the capstan pulley and the capstan flywheel.

Notes:

- 1) After fitting the capstan motor, always run the capstan motor and confirm that there is no abnormality in the running of the belt and between the motor and the pulley.
- 2) Confirm the servo circuit and perform simultaneous adjustment.
- 3) Use only the specified screws for mounting the motor as it may be damaged by the use of unspecified ones.

LOADING MOTOR REPLACEMENT

● Replacement

- 1) Unsolder the lead.
- 2) Remove the two loading motor angle fixing screws (XHPSD30P06WS0) and then the loading motor angle.
- 3) Remove the E-ring (XRESJ25-04000) and then the worm wheel.
Next remove the two screws (2) (XBPSD30P-05J00) and the L-Motor.

- 4) Replace the loading motor together with pulley.

Notes:

- 1) Check that the spacing between the motor and the pulley is 3.1 ± 0.1 mm.
- 2) Operate the loading motor after fitting to check for correct belt travel.

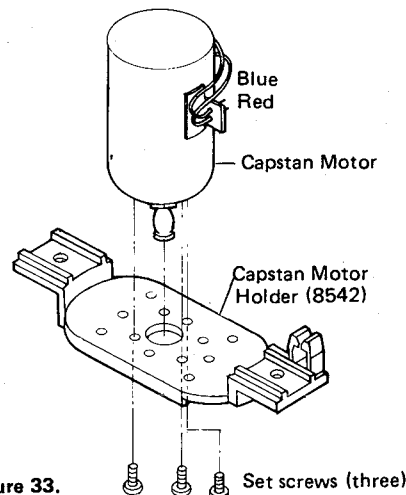


Figure 33.

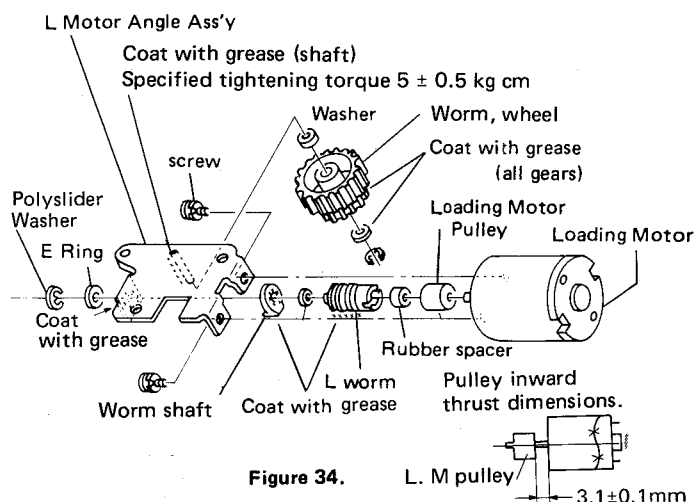


Figure 34.

Note: Dampen the rubber with rubber cleaner to make insertion of the rubber spacer easier. (Oil-based greases, etc. must not be used.)

When A (right diagram) is depressed, the inward thrust must not exceed 5 kg.

DD MOTOR REPLACEMENT

● Removal

- 1) Use a Philips-heads screwdriver to remove the two (SW3P+5S) screw fixing the D.D. rotor assembly.
- 2) Remove the D.D. rotor assembly by pulling straight along the direction of the axis.
- 3) Use a Philips-head screwdriver to remove the three brass (2P + 12S) screwdrivers fixing the stator assembly.
- 4) Remove the D.D. stator assembly by pulling straight along the direction of the axis.

● Fitting

- 1) Place the D.D. stator assembly on the bearing holder.

(Note) Do this so as not to cause any change to the D.D. shield plate or the D.D. shields.

2) Fit the D.D. stator using the two brass (2P + 12S) screws.

(Note) Do this so as not to disturb the core, winding, and the whole element.

3) Insert the D.D. rotor assembly on the D shaft.

(Note) Push directly along the axis.

4) Fix the D.D. rotor assembly with the (SW3P+ 5S) screws.

5) Remove the rotor, insert a spacer and replace the rotor when the space between the end of the rotor and the stator is less than 1.6 mm.

6) Do not contact the shaft when locking the (SW3P + 5S) screws.

(Note) Confirm that there is not damage to the upper drum or the video head.

Notes:

- 1) Take care not to damage the upper drum and video heads.
- 2) Handle the tools with care while working on the D.D. motor.
- 3) Do not let tools or the D.D. rotor assembly etc., contact or hit the Hall elements.

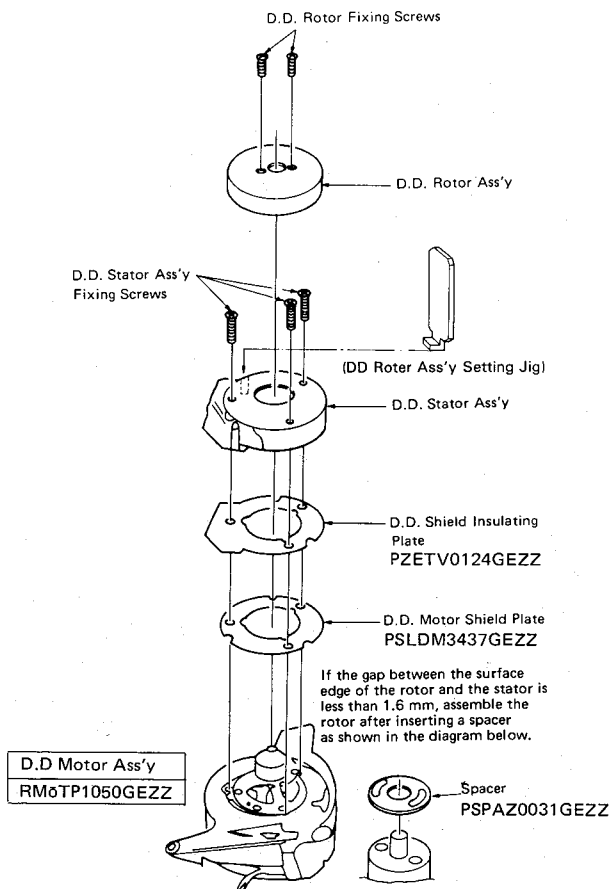


Figure 35.

FG Head Replacement

● Removal

- 1) Remove the FG head lead from the FG head.
- 2) Unscrew the two machine screws (XBPSD-20P06J00) to remove the FG head from the FG head base 8638.

● Installation

- 1) Install the FG head on the FG head base 8638 with two machine screws (XBPSD20P06J00).
- 2) Solder the FG head lead with the FG head.

Note 1: Handle carefully the flywheel magnet and the FG head surface.

Note 2: Use no magnetic tools.

Confirmation

1. The gap between the FG head and the flywheel magnet must meet the standards ranging from 0.08 to 0.18. (Use thickness gauge for checking.)
2. When the gap does not meet the standards, unscrew the two machine screws (XHPSD-30P05000) holding the FG head base 8683 and tighten them again with a torque of 0.6 Kg.cm temporarily.
3. Put a 0.13-mm spacer between the FG head and the flywheel, and push it slightly by a hand. (See the figure 36.)
4. Tighten the two machine screws (XHPSD-30P05000) with a torque of 8 ± 1 kg.cm before applying the screw-locking substance on them.
5. Reconfirm Item 1.

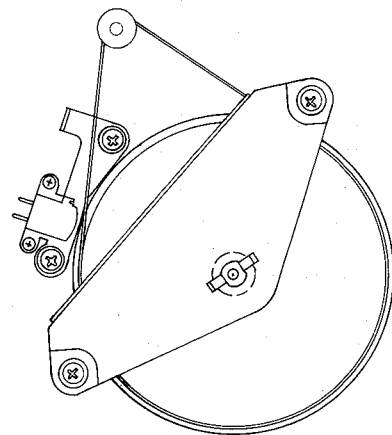


Figure 36.

ADJUSTMENT OF ELECTRICAL CIRCUITS

• TP VR LAYOUT DRAWING

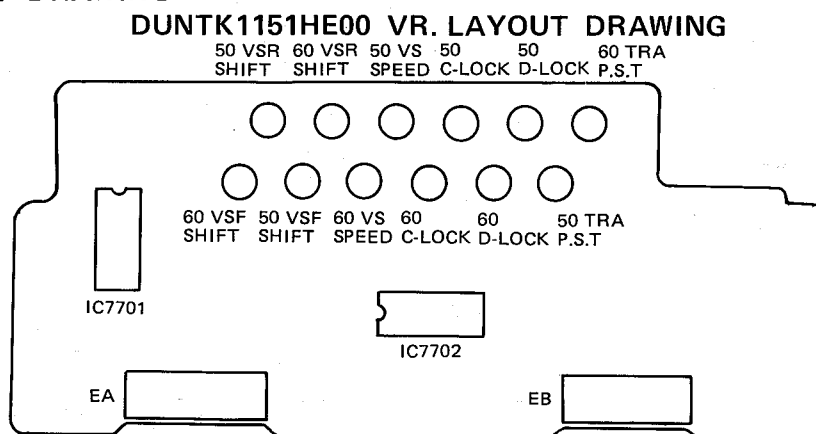
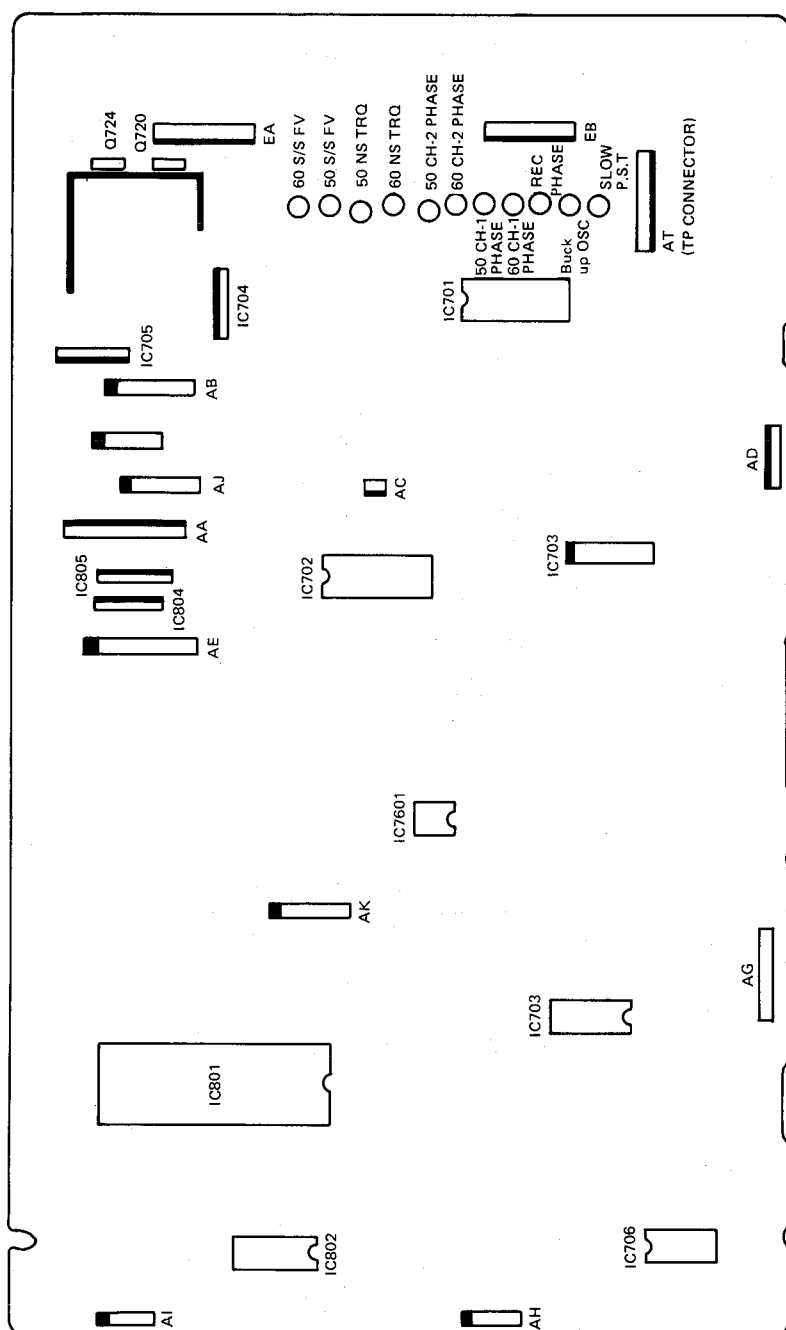
**DUNTK1145HE00 TP VR LAYOUT DRAWING**

Figure 37.

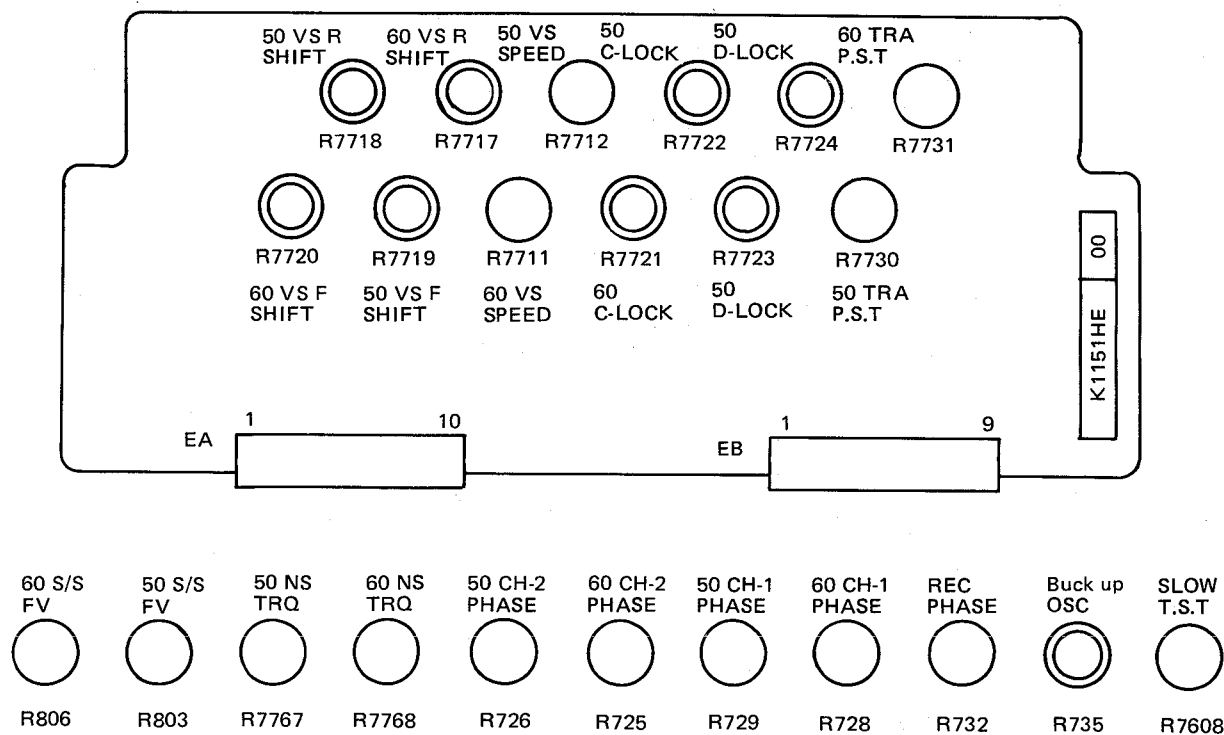
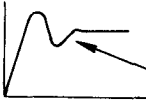


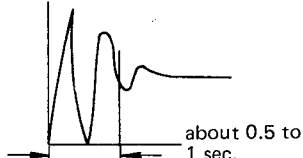
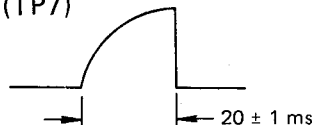
Figure 38.

Note) ☉ : Blue VR (Metal glaze VR)

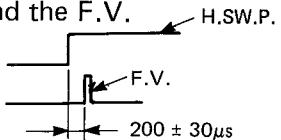
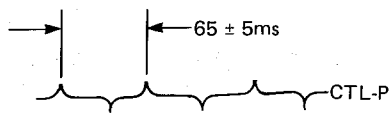
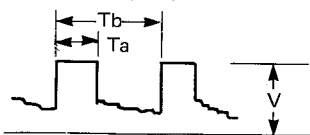
- Adjust the servo circuit of the VC-477E following the instructions shown below.
- The adjustments should be made first for NTSC system and next for P/S (PAL/SECAM) system.

2.1 (NTSC) VR-OATSV 2-1-1 SERVO ADJUSTMENT

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
1. 1-1	[Drum and Reel Servos] Buffer Oscillator Adjustment	R735	E.E. NTSC Signal		(1) With no signal adjust the buffer-oscillator for a free run of $54 \text{ Hz} \pm 0.5 \text{ Hz}$. (2) Apply a tuner or video input and check that the frequency quickly rises to 60 Hz.	[Counter] TP 2 [Synchro] TP 2 frequency
1-2	D-Lock Adjustment	R7723	PB	MONO SCOPE or COLOR BAR	(1) Adjust TP 5 to $3.7 \pm 0.2 \text{ V}$. (2) Repeatedly switch between STOP and PB to check that smoothness is achieved within 2 to 3 seconds.  * The reel torque and back-tension should be checked and adjusted prior to this step.	[Synchro] TP 5
1-3	CH-1 & CH-2 Adjustment	R728 R725	PB	MONO SCOPE or COLOR BAR	(1) Trigger TP 1 (H.S.W.P.) at the rise and fall, and adjust spacing between V-OUT and V-SYNC to $6.5 \pm 0.3 \text{ H}$. (2) The relative error between CH1 and CH-2 should be 0.2 to 0.3H. * This step affects the FV adjustment.	(H.S.W.P.) TP 1 (V-OUT) V DEC OUT terminal (terminal assembly) [Synchro]
1-4	REC. phase Adjustment	R723	REC	TAPE	(1) Adjust the spacing between V-SYNC and H.S.W.P. to $6.5 \pm 0.5 \text{ H}$.	[Synchro] TP 1 VIDEO OUT terminal
1-5	VS-FF Drum Shift; VS-FF Speed Adjustment	R7720 R7711	VS-FF	COLOR BAR	(1) Set the machine to VS-FF and adjust R7720 so that $15.734 \text{ kHz} \pm 0.5\% \text{ max}$. (2) Adjust R7711, so that the CTL pitch of TP 6 is approximately equal to 4.6 ms. (3) Recheck step 1-5 (1)	[Visual synchro]

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
1-6	VS-REW Drum Shift; VS-REW Speed Adjustment & Check	R7717 (R7711)	VS-REW	COLOR BAR	<p>(1) Set the machine to VS-REW and adjust R7717 so that $15.734 \text{ kHz} \pm 0.5\%$ max.</p> <p>(2) Make sure that three noise bars flow up and down slightly. If the flow is extremely fast, adjust R7711 so that the noise bars in step 1-5 (2) can be on the same level as REW SPEED.</p> <p>(3) Recheck step 1-6 (1)</p>	[Visual]
2 2-1	[Capstan Servo Adjustment] C-LOCK Adjustment	R7721	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust TP3 at R7721 (C-LOCK) to $3.8 \pm 0.2\text{V}$ max.</p> <p>* D-LOCK and normal reel torque should be adjusted prior to this step.</p> <p>(2) Switch repeatedly between STILL and NORMAL to check that stability as achieved within 0.5 to 1 second.</p> 	[Synchro] TP3
2-2	N.S. Tracking Preset Adjustment	R7731	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust R7731 for a tracking multivibrator delay time of $20 \pm 1 \text{ ms}$ (TP7)</p>  <p>* R701 (in Y/C PWB) Tracking VR → Center</p>	[Synchro] TP7
3 3-1	[Reel Torque Adjustment] NS Reel Torque Adjustment	R7768	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust R7768 for a voltage between reel motor terminals to be $2.1\text{V} \pm 1\text{V}$ max. (take up torque is within $185 \pm 15 \text{ g.cm}$).</p>	[Synchro] Reel motor terminals

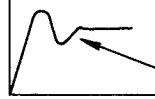
2-1-2 TRICK MOTION ADJUSTMENT AND CHECKING

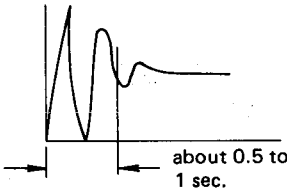
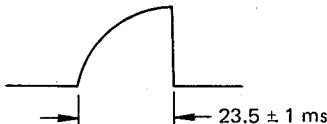
Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
4	FV Adjustment				(Preparations) (1) Adjust the servos for CH-1, CH-2, D-Lock, C-Lock and Normal Tracking, VS speed, and VS drum shift (REW and FF). (2) The maximum FV misalignment permissible is ± 0.5 H (Max. $\pm 30 \mu\text{s}$).	
4-1	CH-1, CH-2 REC Phase Check	R728 R725 R723	PB	MONO SCOPE or COLOR BAR	(1) Check that the interval between H.SW.P. and PB V-SYNC is within $6.5 \pm 0.5\text{H}$, and the phase difference between CH-1 and CH-2 is within 0.2 to 0.3H . (2) REC phase $6.5 \pm 0.5\text{H}$.	The same as in Steps 1-3 and 1-4.
4-2	FV Check	—	STILL (PAUSE)	MONO SCOPE or COLOR BAR	(1) Check FV Pulse such that the spacing of $200 \pm 30 \mu\text{s}$ between the H.SW.P. rise and the F.V. 	[Synchro] TP8 (Video Out)
4-3	SLOW DRIVE Adjustment	R7608	SLOW Note 1	MONO SCOPE or COLOR BAR	(1) Adjust R7608 so that the output at TP6 (CTL-P) is 65 ± 5 msec.  * Note 1: For this adjustment, keep the slow (in Y/C PWB) position: Slow Max ($\frac{1}{2}$ slow).	[Synchro] TP6
4-4	SLOW DRIVE Pulse check	—	SLOW Note 1 Note 2	MONO SCOPE or COLOR	(1) Check that the drive pulse output at TP10 has the following waveform: $V = 4.8 \pm 1$ (V) $T_a = 23 \pm 5$ (ms), $T_b = 33$ (ms).  * Note 2: Make measurement across capstan motor. During measurement, do not connect another GND.	[Synchro] Across TP9, TP10

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
4-5	SLOW-STILL FV Adjustment	R806	STILL Note 3	MONO SCOPE or COLOR BAR	<p>(1) Adjust R806 such that the spacing between the H.S.W.P. fall and the FV front edge is approximately $250 \mu s$ (the position where no image disturbance occurs).</p> <p>(2) If this is $250 \pm 30 \mu s$ or more out of alignment, adjust CH-1 and CH-2 and re-check.</p> <p>(3) Visually check that there is no fluctuation of the picture.</p> <p>* Note 3: Use 1/20 SLOW to set a noiseless still screen.</p>	<p>[Synchro] TP 8</p> <p>(Video Out)</p>
4-6	VS-FV Check	—	VS (FF or REW)	MONO SCOPE or COLOR BAR	<p>(1) Check that the interval between the rise of H-SW-P and the FV pulse is $200 \pm 30 \mu s$.</p> <p>(2) Visually correct CH-2 R725 VR to eliminate deflection on the screen, and adjust it at the optimum point.</p> <p>(3) Change to PB (normal speed) to check CH-1, CH-2 phase for standard in step 1-3.</p>	<p>[Synchro] TP8</p> <p>(Video Out)</p>

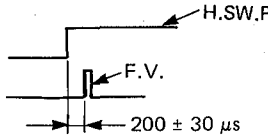
2-2 PAL/SECAM VR-OCPSV 2-2-1 SERVO ADJUSTMENT

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
1 1-1	[Drum and Reel Servos] Buffer Oscillator Check	—	E.E.		<p>(1) With no signal check the buffer-oscillator for a free run of $46 \text{ Hz} \pm 1.0 \text{ Hz}$.</p> <p>(2) Apply a tuner or video input and check that the frequency quickly rises to 50 Hz.</p>	<p>[Counter] TP2</p> <p>[Synchro] TP2</p>

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
1-2	D-Lock Adjustment	R7724	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust TP5 to $3.7 \pm 0.2V$.</p> <p>(2) Repeatedly switch between STOP and PB to check that smoothness is achieved within 2 to 3 seconds.</p>  <p>* The reel torque and back-tension should be checked and adjusted prior to this step.</p>	[Synchro] TP5
1-3	CH-1 & CH-2 Adjustment	R729 R726	PB	MONO SCOPE or COLOR BAR	<p>(1) Trigger TP1 (H.SW.P.) at the rise and fall, and adjust spacing between V-OUT and V-SYNC to $6.5 \pm 0.3H$.</p> <p>(2) The relative error between CH-1 and CH-2 should be 0.2 to 0.3H.</p> <p>* This step affects the FV adjustment.</p>	(H.SW.P.) TP5 (V-OUT) VIDEO OUTPUT terminal [Synchro]
1-4	VS-FF Drum Shift; VS-FF Speed Adjustment	R7717 R7712	VS-FF	COLOR BAR	<p>(1) Set the machine to VS-FF and adjust R7717 so that $15.625 \text{ kHz} \pm 0.5\%$ max.</p> <p>(2) Adjust R7712, so that the CTL pitch of TP6 is approximately equal to 4.3 ms.</p> <p>(3) Recheck step 1-4 (1).</p>	[Visual synchro]
1-5	VS-REW Drum Shift; VS-REW Speed Adjustment & Check	R7718 R7712	VS REW	COLOR BAR	<p>(1) Set the machine to VS-REW and adjust R7718 so that $15,625 \text{ kHz} \pm 0.5\%$ max.</p> <p>(2) Check that four noise bars flow up and down slightly. If the flow is extremely fast, adjust R7712 so that the noise bars in step 1-4 (2) can be on the same level as REW SPEED.</p> <p>(3) Recheck step 1-5 (1)</p>	[Visual]

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
2 2-1	[Capstan Servo Adjustment] C-LOCK Adjustment	R7722	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust TP3 at R7722 (C-LOCK), to $3.8V \pm 0.2V$ max.</p> <ul style="list-style-type: none"> • D-LOCK and normal reel torque should be adjusted prior to this step. <p>(2) Switch repeatedly between STILL and NORMAL to check that stability is achieved with 0.5 to 1 second.</p> 	[Synchro] TP3
2-2	N.S Tracking Preset Adjustment	R7730	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust R7730 for a tracking multivibrator delay time of 23.5 ± 1 ms (TP7).</p>  <p>* R701 (in Y/C PWB) Tracking VR → Center</p>	[Synchro] TP7
3 3-1	[Reel Torque Adjustment] NS Reel Torque Adjustment	R7767	PB	MONO SCOPE or COLOR BAR	<p>(1) Adjust R7767 for a REEL MOTOR voltage of so that the take-up torque $1.9V \pm 0.1V$ max. (take up torque is within 175 ± 15 g.cm).</p>	Synchro REEL MOTOR voltage

2-2-2 TRICK MOTION ADJUSTMENT AND CHECKING

Step No.	Step	VR	Mode	Tape	Nature of check adjustment & points to note	T.P.
4	FV Adjustment				(Preparations) (1) Adjust the servos for CH-1, CH-2, D-Lock, C-Lock and Normal Tracking, VS speed and VS drum shift (REW and FF). (2) The maximum FV misalignment permissible is ± 0.5 H (Max. $\pm 30 \mu s$).	
4-1	CH-1, CH-2 REC Phase Check	R729 R726 R723	PB	MONO SCOPE or COLOR BAR	(1) Check that the interval between H.SW.P. and PB V-SYNC is within 6.5 ± 0.5 H, and the phase difference between CH-1 and CH-2 is within 0.2 to 0.3H. (2) REC phase 6.5 ± 0.5 H.	CH-1, CH-2 Phase Step 1-3 (P/S) REC Phase Step 1-4 (NTSC)
4-2	VS FV Check	—	STILL	MONO SCOPE or COLOR BAR	(1) Check to TP8 with that the spacing of $200 \pm 30 \mu s$ between the H.SW.P. rise and the F.V. 	[Synchro] TP8 (Video Out)
4-3	SLOW-STILL Adjustment	R803	STILL	MONO SCOPE or COLOR BAR	(1) Adjust R803 such that the spacing between the H.SW.P. fall and the FV front edge is approximately $230 \mu s$ (the position where no image disturbance occurs). (2) If this is $230 \pm 30 \mu s$ or more out of alignment, adjust CH-1 and CH-2 and re-check.	[Synchro] TP8 (Video Out)
4-4	VS FV Check	—	VS (FF or REW)	COLOR BAR	(1) Check that the horizontal lines do not overlap in V.S. (2) Re-adjust CH-1 and CH-2 for a difference of $\pm 30 \mu s$ or less from optimum. (3) If this is not achieved, check the CH-1 and CH-2 switching point and V-head mounting. Note: For this adjustment, keep the slow switch at PB (Normal Speed) position.	[Synchro] TP8 (Video Out)

METHOD OF ADJUSTMENT

Y/C circuit

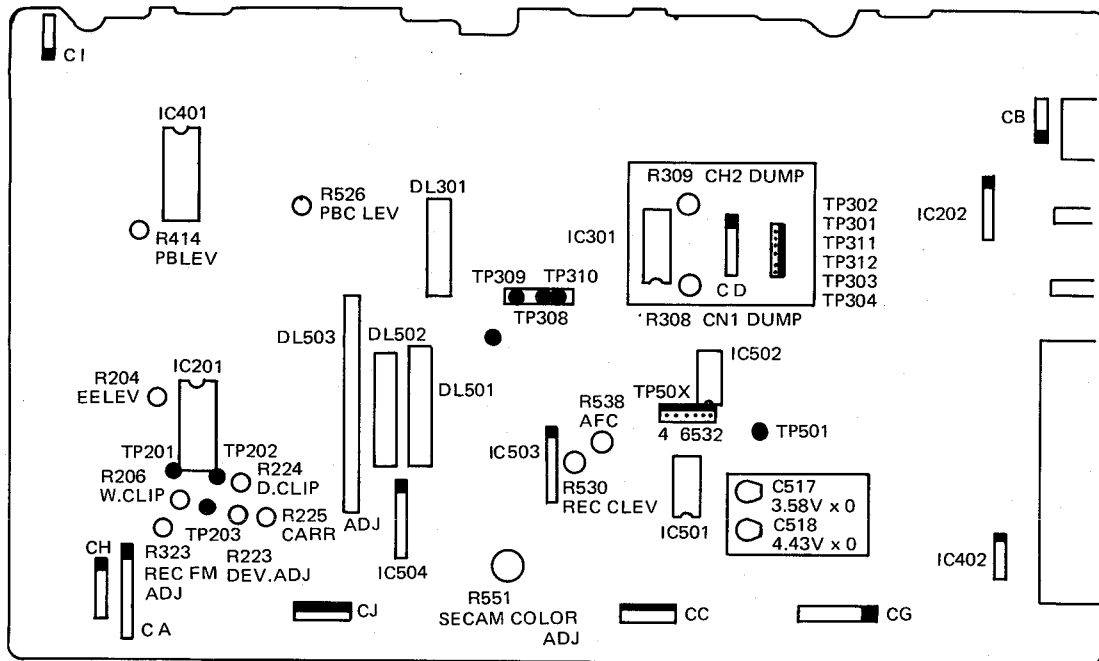


Figure 39.

1. Major volume parts layout drawing (Fig. 39)
2. How to adjust Y/C circuit

- **EE level adjustment**

- 1) Place the set in the REC mode and set the system SW to PAL B/G.
- 2) Enter a PAL color bar signal into VTR and observe Q405 emitter with an oscilloscope.
- 3) Adjust R204 (EE level) as shown in Fig. 40.

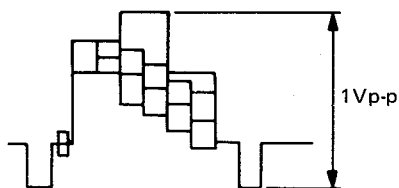


Figure 40.

- **Adjustment of FM carrier and deviation**

Make this adjustment only when IC201 is replaced or when carrier frequency is clearly deviated.

- 1) Place the set in the REC mode and set the system SW to PAL B/G.
- 2) Set the VTR input change-over SW in the AUX mode. Enter no signal in VIDEO IN.
- 3) Connect a frequency counter to TP201. Adjust R225 (CARR, ADJ) so that the reading of counter can be 3.8 MHz.
Before this adjustment, remove R206 (W. CLIP) and R224 (DARK CLIP) in advance (Set both of them unclipped).

- 4) Then enter a PAL color bar signal. Connect an oscilloscope to IC 201 pin (16) to observe the white peak DC potential as shown in Fig. 41.

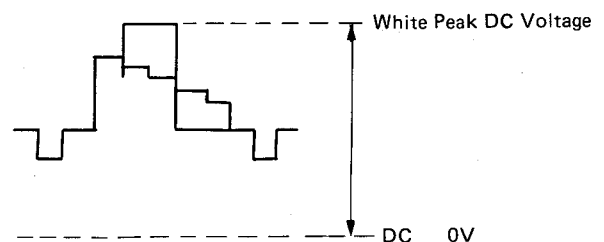


Figure 41.

- 5) Then disconnect the input signal. Connect the constant-voltage regulated power supply to IC 201 pin (16) and control it so that the DC potential at pin (16) can be equal to that measured in 4) (Relative error within the range of $\pm 0.1V$).
Note) Never apply DC 5V or more to IC201 pin (16).
- 6) Connect the counter to TP201 and adjust R223 (DEV, ADJ) so that the counter can read 4.76 MHz.
- 7) After adjustment, disconnect the constant-voltage regulated power supply, counter and oscilloscope.

● Adjustment of white and dark clips

- 1) Place the set in the REC mode and set the system SW to PAL B/G.
- 2) Enter a PAL color bar signal and connect the oscilloscope to TP202.
- 3) Adjust R206 (White clip) and R224 (Dark clip) so that the clipping points can be as shown in Fig. 42.

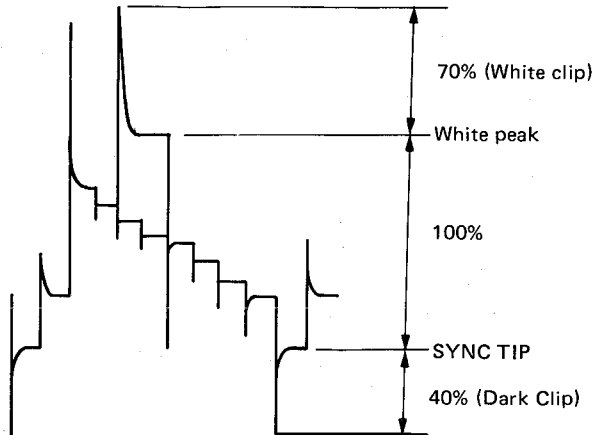


Figure 42.

● Adjustment of 4.43 MHz V.X.O

- 1) Play back PAL color bar tape and set the system SW to PAL B/G.
- 2) Connect the frequency counter to TP501.
- 3) Connect a 22K ohm resistor between TP506 and TP502 (GND).
- 4) Adjust C518 (4.43 V.X.O ADJ) so that the frequency counter can read 4.433619 MHz.
- 5) After adjustment, disconnect the 22K ohm resistor.

● Adjustment of 3.58 MHz V.X.O

- 1) Play back NTSC color bar tape and set the system SW to NTSC 3.58.
- 2) Connect the frequency counter to TP501.
- 3) Connect a 22K ohm resistor between TP506 and TP502 (GND).
- 4) Adjust C517 (3.58 V.X.O ADJ) so that the frequency counter can read 3.579545 MHz.
- 5) After adjustment, disconnect the 22 ohm resistor.

● AFC adjustment

- 1) Play back PAL color bar tape and set the system SW to PAL B/G.
- 2) Connect the oscilloscope to TP504 and adjust R538 (AFC) so that the DC potential of TP504 can be 2.5V.

The TPs for adjusting the chroma circuit are of socket type.

The sequence is as shown in Fig. 43.



Figure 43.

● Adjustment of recording current

- 1) Place the set in the REC mode and set the system SW to PAL B/G.
- 2) Input the PAL color bar sign to VTR.
- 3) Place the oscilloscope in the dual mode. Connect CH1 probe between TP304 and TP303 (GND), and CH2 probe between TP301 and TP302 (GND). The TPs are arranged as shown in Fig. 44.

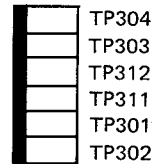


Figure 44.

- 4) Set R323 (REC FM) in the minimum position.
- 5) Then adjust R530 (REC. C. LEV.) so that the chroma recording current can reach the level shown in Fig. 45.

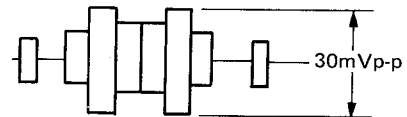


Figure 45.

- 6) Adjust R323 (REC. FM.) so that the FM recording current can reach the level shown in Fig. 46.

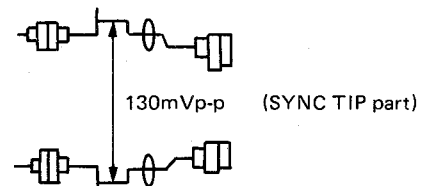


Figure 46.

● Adjustment of playback amplifier

- 1) Play back 3H RF sweep tape and set the system SW to PAL B/G.
- 2) Set the oscilloscope in the dual mode. Connect CH1 probe between TP308 and TP309 (GND), and CH2 probe to TP310 (H SW pulse).
- 3) Adjust R309 (CH2 DUMP) so that a 4.8 MHz output can be maximized.
- 4) Adjust R308 (CH1 DUMP) so that the 4.8 MHz output of CH1 can be equal to that of CH2.

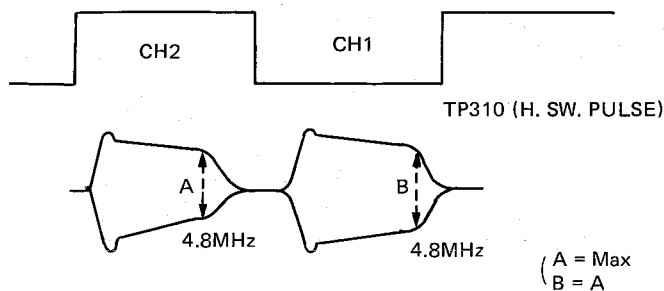


Figure 47.

● Adjustment of playback Y level

- 1) Play back alignment tape PAL color bar signal and set the system SW to PAL B/G.
- 2) Connect the oscilloscope to Q405 emitter.
- 3) Adjust R414 (PB. LEV.) so that 1Vp-p can be obtained between SYNC. TIP and white peak as shown in Fig. 48.

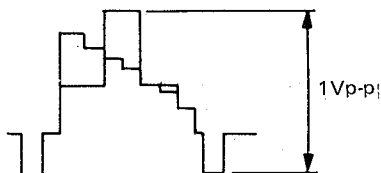


Figure 48.

● Adjustment of playback C level

- 1) Playback alignment tape PAL color bar signal and set the system SW to PAL B/G.
- 2) Connect the oscilloscope to Q405 emitter.
- 3) Adjust R526 (PB. C. LEV.) so that the burst level can go to 0.3Vp-p as shown in Fig. 49.

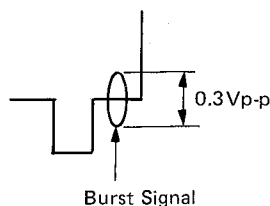


Figure 49.

● Adjustment of Secam color

- 1) Self-record a SECAM color bar signal and set the system in the ME SECAM mode.
- 2) Play back the recorded tape. Adjust R551 (SECAM. C. ADJ) so that the SECAM break on the playback screen can be minimized.

● Adjustment of APC ADJ (E-E mode)

- 1) Set the LINE/TUNER switch to LINE.
- 2) Enter no signal.
- 3) Connect the frequency counter to TP3004 (GND TP3003).
- 4) Adjust C2021 so that the frequency counter can read 4.433619 MHz \pm 10 Hz.

● Adjustment of phase shift detector (E-E mode)

- 1) Enter a PAL color bar signal (A Phillips pattern being broadcasted can be also entered).
- 2) Connect a synchronous probe to TP3005.
- 3) Adjust the coil of L3005 to obtain the waveforms given in Table 1.

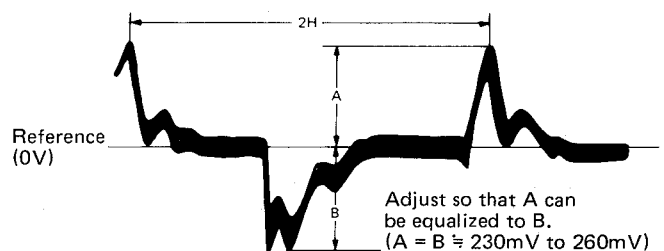


Figure 50.

● REC SYSTEM DET (REC mode)

- 1) Enter a PAL color bar signal (or a RF PAL signal).
- 2) Connect a digital voltmeter to TP3001 (GND TP3003).
- 3) Adjust the volume of R3005 so that the voltage can reach 3.6V \pm 0.1V.

● PB SYSTEM DET (PB mode)

- 1) Play back NTSC tape.
- 2) Connect a digital voltmeter to TP3002 (GND TP3003).
- 3) Adjust the volume R3021 so that the voltage can reach 4.0V \pm 0.1V.
(Note)
If it is uneasy to make adjustment, depress the NTSC 3.58 MANUAL button.

IF CIRCUIT

1. Major volume parts layout drawing (Fig. 51)
2. How to adjust IF circuit

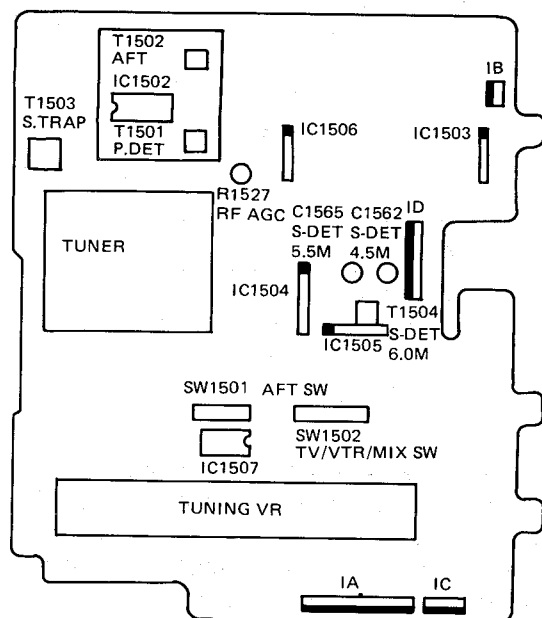


Figure 51.

- **SIF adjustment**

- (1) **PAL i system adjustment**

- 1) Enter a PAL i signal into the set. Make normal tuning and turn on the AFT SW.
- 2) Place the system SW in the PAL-i mode.
- 3) Connect the valve voltmeter to pin ⑥ of ID connector.
- 4) Adjust T1504 (S-DET 6.0MHz) so that the valve voltmeter can read the maximum value.

- (2) **PAL B/G system adjustment**

- 1) Enter a PAL B/G signal into the set. Make normal tuning and turn on the AFT SW.
- 2) Place the system SW in the PAL B/G mode.
- 3) Connect the valve voltmeter into pin ⑥ of ID connector.
- 4) Adjust C1565 (S-DET 5.5MHz) so that the valve voltmeter can read the maximum value.

- (3) **M system adjustment**

- 1) Enter an NTSC M signal into the set. Make normal tuning and turn on the AFT SW.
- 2) Place the system SW in the NTSC 3.58 mode.
- 3) Connect the valve voltmeter to pin ⑥ of ID connector.
- 4) Adjust C1562 (S-DET 4.5MHz) so that the valve voltmeter can read the maximum value.

- **Adjustment of primary AUTO sensing supply voltage (R9915 P. TAP ADJ)**

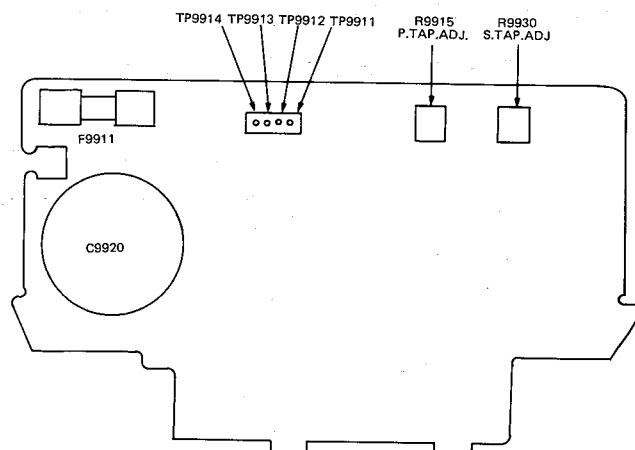
POWER SUPPLY AUTO PW AND TP VR LAYOUT DRAWING

Figure 52.

- 1) Set the STAND BY mode and fully turn R9915 clockwise.
- 2) Set AC input voltage to 158V \pm 1V and adjust R9915 at the point where TP9911 changes from L to H.

(Note)

- Turn R9915 slowly and carefully.
- One TP9911 changes from L to H, drop the input voltage up to about 100V because hysteresis occurs in the circuit. After TP9911 returns to L, raise the voltage to 158V gradually.

- 3) **Checking**

Drop the AC input to about 100V to make sure that TP9911 is on level L. Then gradually raise the AC input to make sure that TP9911 changes from L to H on AC158V \pm 2V.

- **Checking of AT 13V**

- 1) Set the ON-STOP mode on AC110V or 220V.
- 2) Make sure that AT13V (Lead on C913 side or R928 or R915) is within 13 + 0.6V/ - 0V.

- **Adjustment of secondary AUTO sensing supply voltage (R9930)**

- 1) Fully turn R9930 counter-clockwise.
- 2) Set the TUNER REC mode on AC127V. Connect a synchroscope between TP9913 and TP9914. Drop the input voltage so that the valley of ripple waveform of TP9913 can obtain 14.5 + 0.5V/ - 0V.
- 3) Gradually turn R9930 clockwise and adjust it at the point where the voltage of TP9914 changes from L to H.
- 4) (Checking) Raise the AC input. Return TP9914 from H to L. Then drop the AC input gradually again to make sure that the voltage at the ripple valley of TP9914 is 14.5V + 0.5V/ - 0V when TP9914 changes from L to H.

● Adjustment of 12V (R920)

- 1) Set the TUNER REC mode on AC 110V or 220V.
- 2) Adjust R920 so that the voltage between TP912 and TP911 (GND) can obtain $12.0V \pm 0V/0.1V$.

DUNTK1153HE00 TP LAYOUT DRAWING

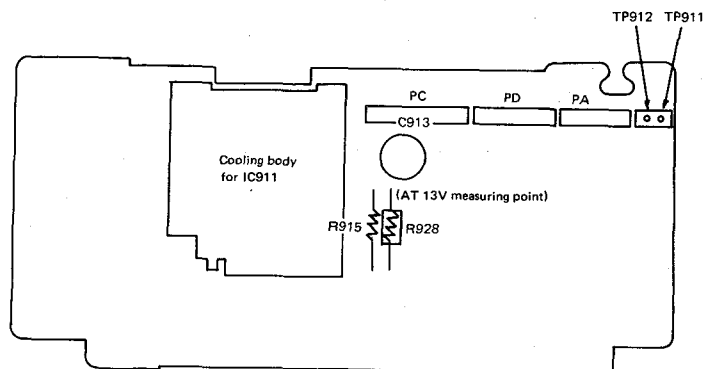


Figure 53.

● PB level adjustment

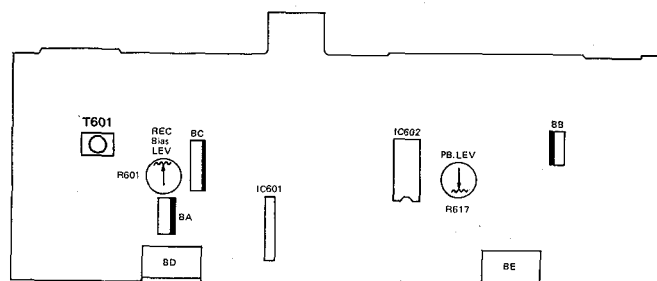


Figure 54.

- 1) Set the system switch to AUTO.
- 2) Play back alignment tape (tape on which 1-KHz signals are entered) (VMAE).
- 3) Issue waveforms from terminal assembly AUDIO OUT and adjust R617 to $-9dBm$ ($=0.275Vrms$).

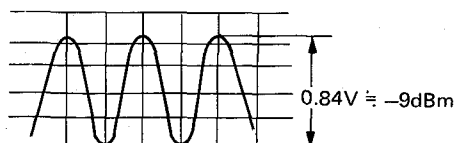


Figure 55.

● Adjustment of REC Bias current

- 1) Connect a valve voltmeter across AUDIO HEAD R8007.
- 2) Enter no signal into AUDIO INPUT.
- 3) Set the REC mode and adjust R601 to $320\mu A \pm 5\mu A$ (Valve voltmeter reading of $3.2mVrms$).
- 4) At this time, adjust the oscillating bias frequency to 70KHz to 80KHz. If out of range, adjust the core of T601 to about 72KHz.

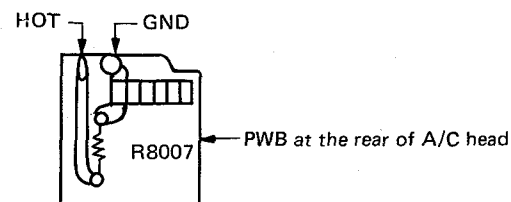


Figure 56.

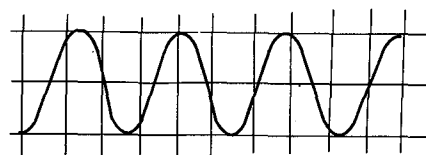


Figure 57.

● Checking of self-recording/playback level

- 1) Enter 1KHz-20dBm ($77mVrms$) from LINE.
- 2) Enter a VIDEO signal from VIDEO LINE.
- 3) Self-record/play back this signal to check for $-5dBm \pm 3dB$ ($\approx 44Vrms \pm 17Vrms$).

GLOSSARY

A	ACL	Auto Clear	P	PAD	Power Assisted Drive
	AD	Address		PB	Playback
	AFC	Automatic Frequency Control		PCM	Pulse Code Modulation
	A-Mute	Audio Mute		P-CON	Power Control
	AL	After Loading	R	PG	Pulse Generator
	APC	Automatic Phase Control		PR	Pinch Roller
	AT	ALL Time		REC	Record
	AV	Audio/Video		REM.	Remote Control
C	CAP	Capstan Motor		REV	Reverse
	CAS.M.	Cassette Motor		REW	Rewind
	C.FG	Capstan Frequency Generator		S/H	Sample Hold
	C.PG	Capstan Pulse Generator		SP	Standard Play
	CSA	Cassette SW-A		SS	Start Sensor
	CSB	Cassette SW-B		STILL-H	Still mode High Level
	CSD	Cassette SW-D		SUP-REEL	Supply Reel
D	CTL	Control		SW	Switch
	D.D.	Direct Drive	T	TPG	Trapezoidal Generator
	D.F.F.	D-Flip Flop		TU-REEL	Take-up Reel
	D.FG	Drum Motor Frequency Generator	U	UL	Unloading
	DM	Drum Motor		V	VCO
	D.PG	Drum Pulse Generator	V	V-Mute	Voltage Controlled Oscillator
	DS (or D/S)	Double Speed		V-Lock	Video Mute
	DS-H	Double Speed High Level		VTVM	Vertical picture jitter
	D.TPG	Drum Trapezoidal Generator		VS (V/S)	Clear-Lock
	DUB	Dubbing			Vacuum Tube Voltage Meter
E	EF	Emitter Follower			Video Search
	EP	Extended Play			
	ES	End Sensor			
F	F-ADV-P	Frame Advance Pulse			
	F.F.	Fast Forward			
	F.G.	Frequency Generator			
	F/R	Forward/Reverse			
	FV	False Vertical Sync.			
	FWD	Forward			
H	HS (H/S)	Half Speed			
	HSP	Head Switching Pulse			
J	J.K-F.F.	J.K-Flip Flop			
K	KE	Key Entry			
L	LDM	Loading Motor			
	LP	Long Play			
M	MIC	Microphone			
	MM	Mono-Multi Vibrator			
N	NC	Non Connection			
	NS (N/S)	Normal Speed			
O	OSC	Oscillator			

SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:

BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET.

PARTS MARKED WITH " Δ " AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.

BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTE:

1. DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.
2. SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.

NOTE:

1. The unit of resistance "ohm" is omitted ($k = 1000 \text{ ohm}$, $M = 1 \text{ Meg ohm}$).
2. All resistors are $1/8$ watt, unless otherwise noted.
3. The unit of capacitance "F" is omitted ($\mu = \mu F$, $p = \mu\mu F$).

VOLTAGE MEASUREMENT CONDITIONS:

1. DC voltages are measured between points indicated and chassis ground by VTVM, with AC110/127/220/240/260V, Auto 50/60Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.
2. Voltages are measured with $10000\mu V$ B & W or colour signal.

WAVEFORM MEASUREMENT CONDITIONS:

$10000\mu V$ 87.5 percent modulated colour bar signal is fed into tuner:

CAUTION:

This circuit diagram is original one. Therefore there may be a slight difference from yours.



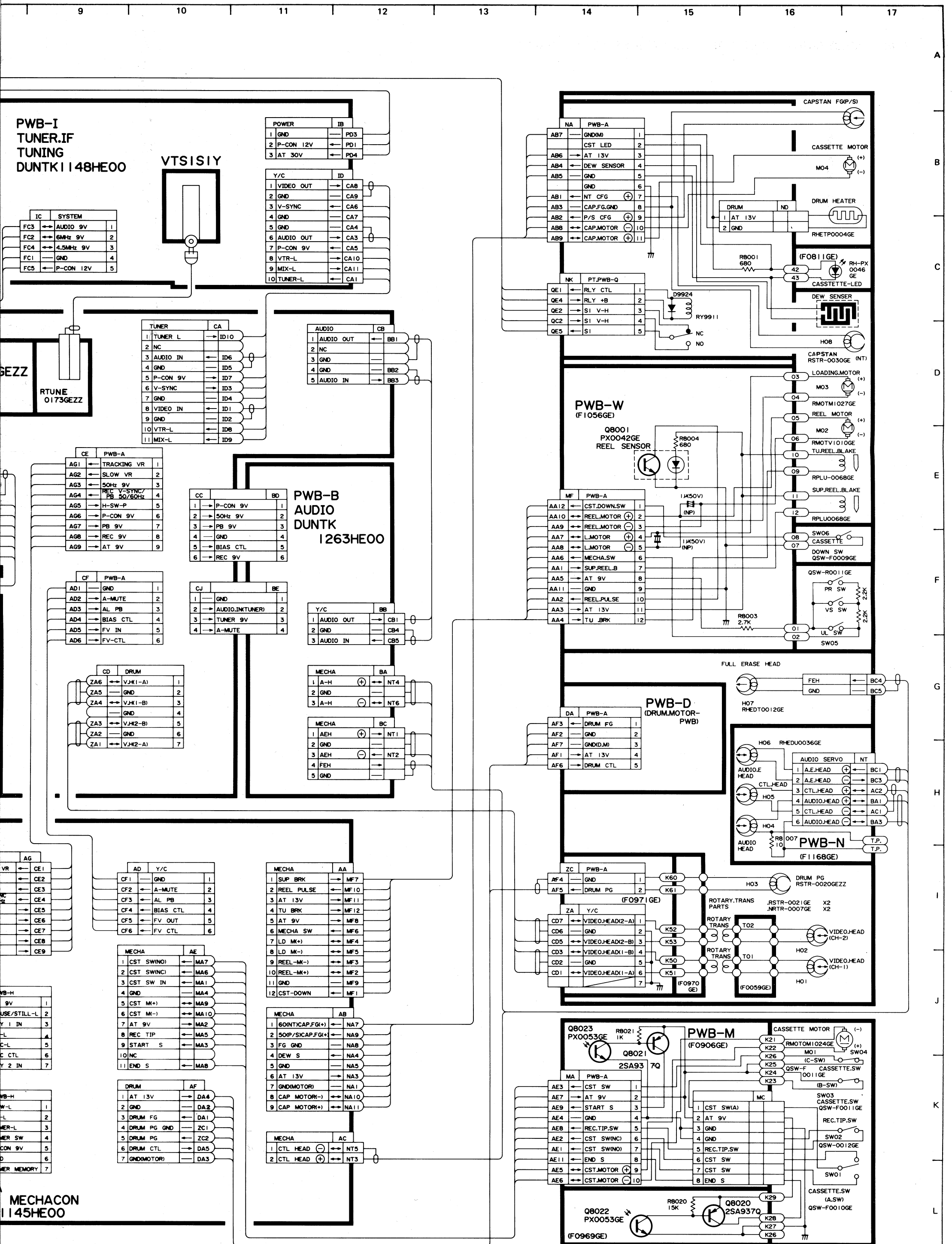


Figure 58.

PWB-A, MECHANICAL CONTROL CIRCUIT SCHEMATIC DIAGRAM

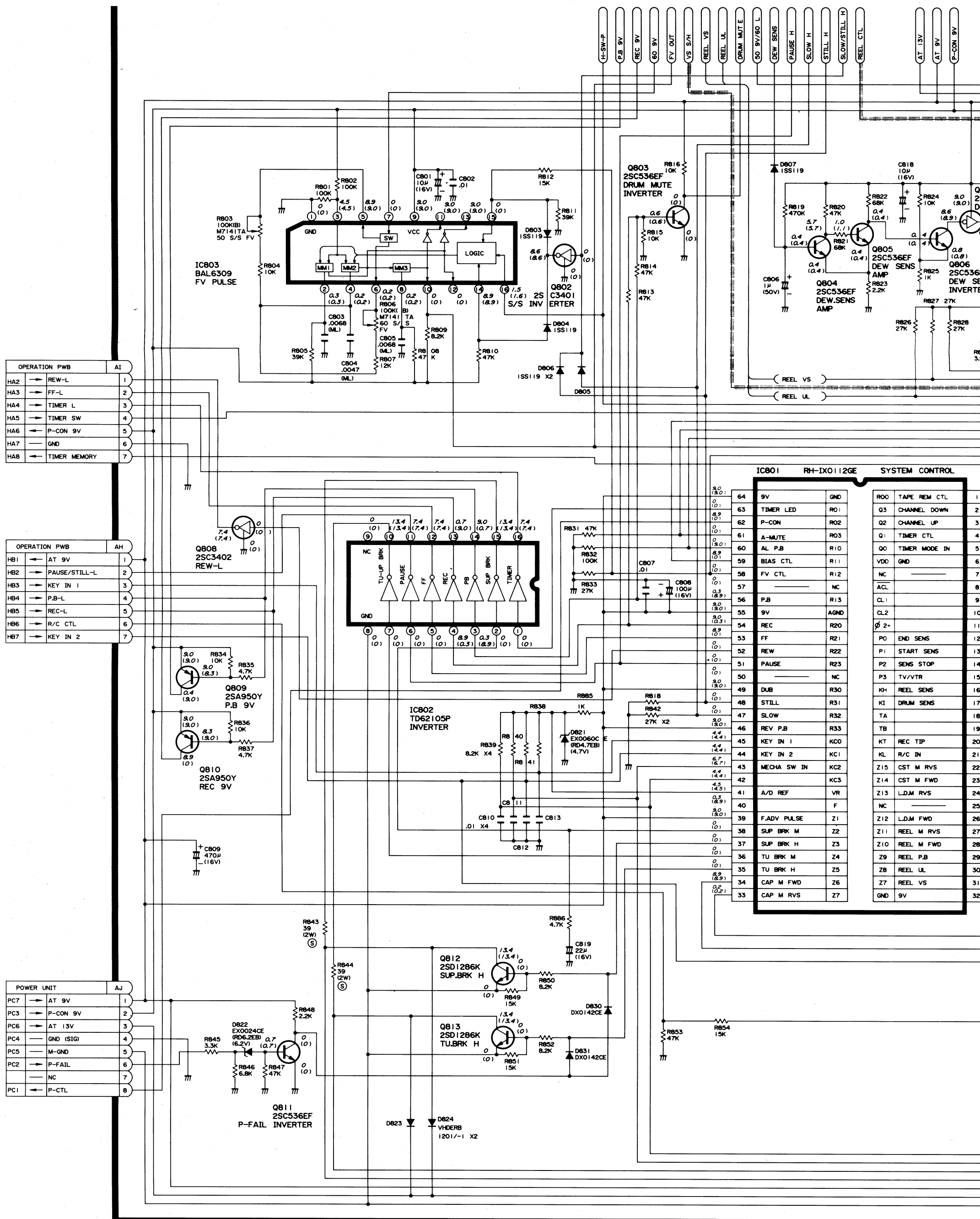


Figure 59.

Reel servo automatic frequency control signal

Note: Refer to figure 63 for diagram PWB.

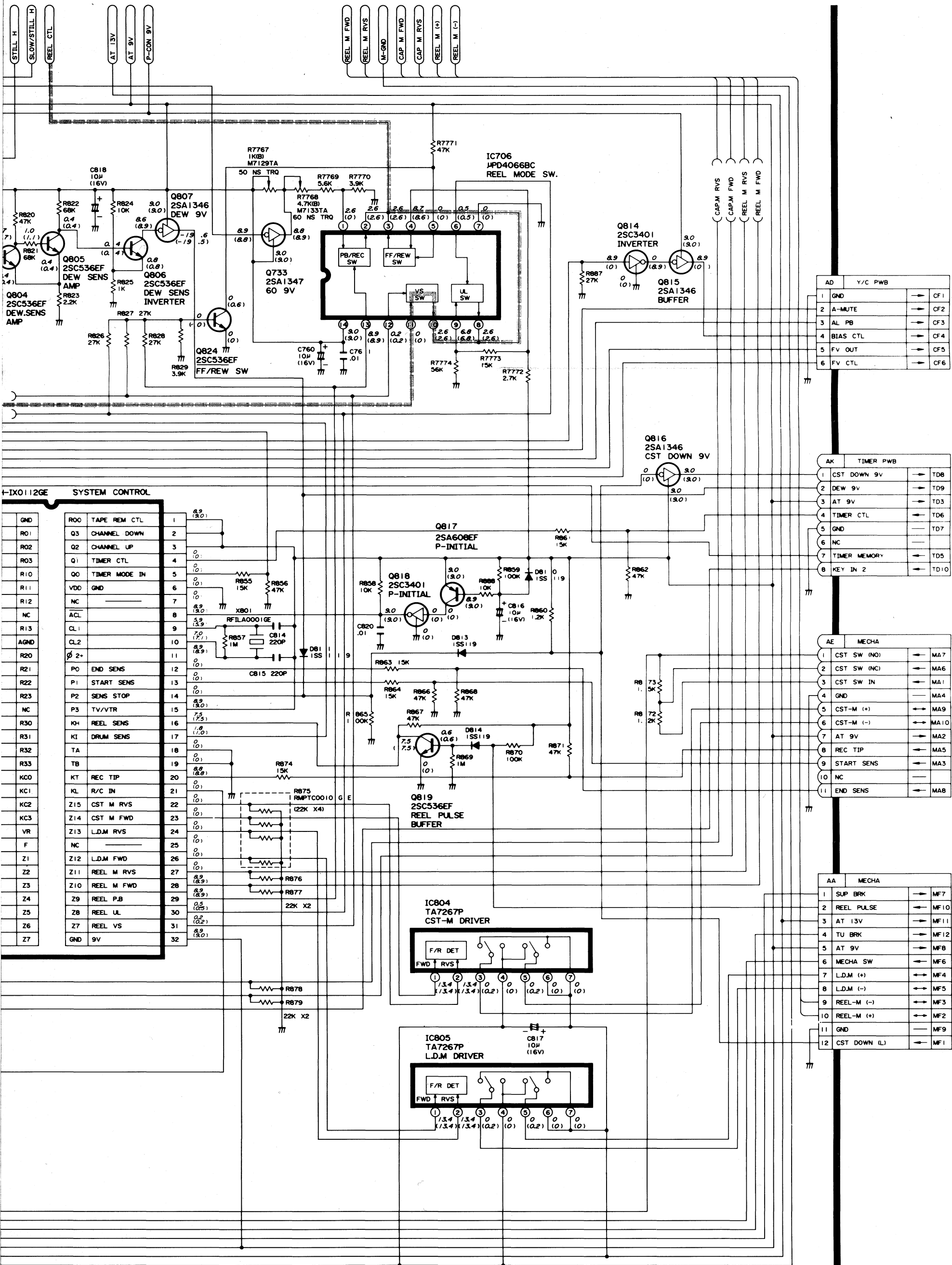


Figure 59.

PWB-A, SERVO CIRCUIT SCHEMATIC DIAGRAM
PWB-E, SERVO SUB SWITCHING CIRCUIT SCHEMATIC DIAGRAM

Capstan servo automatic frequency control signal
Capstan servo automatic phase control signal (PB MODE)
Drum servo automatic frequency control signal

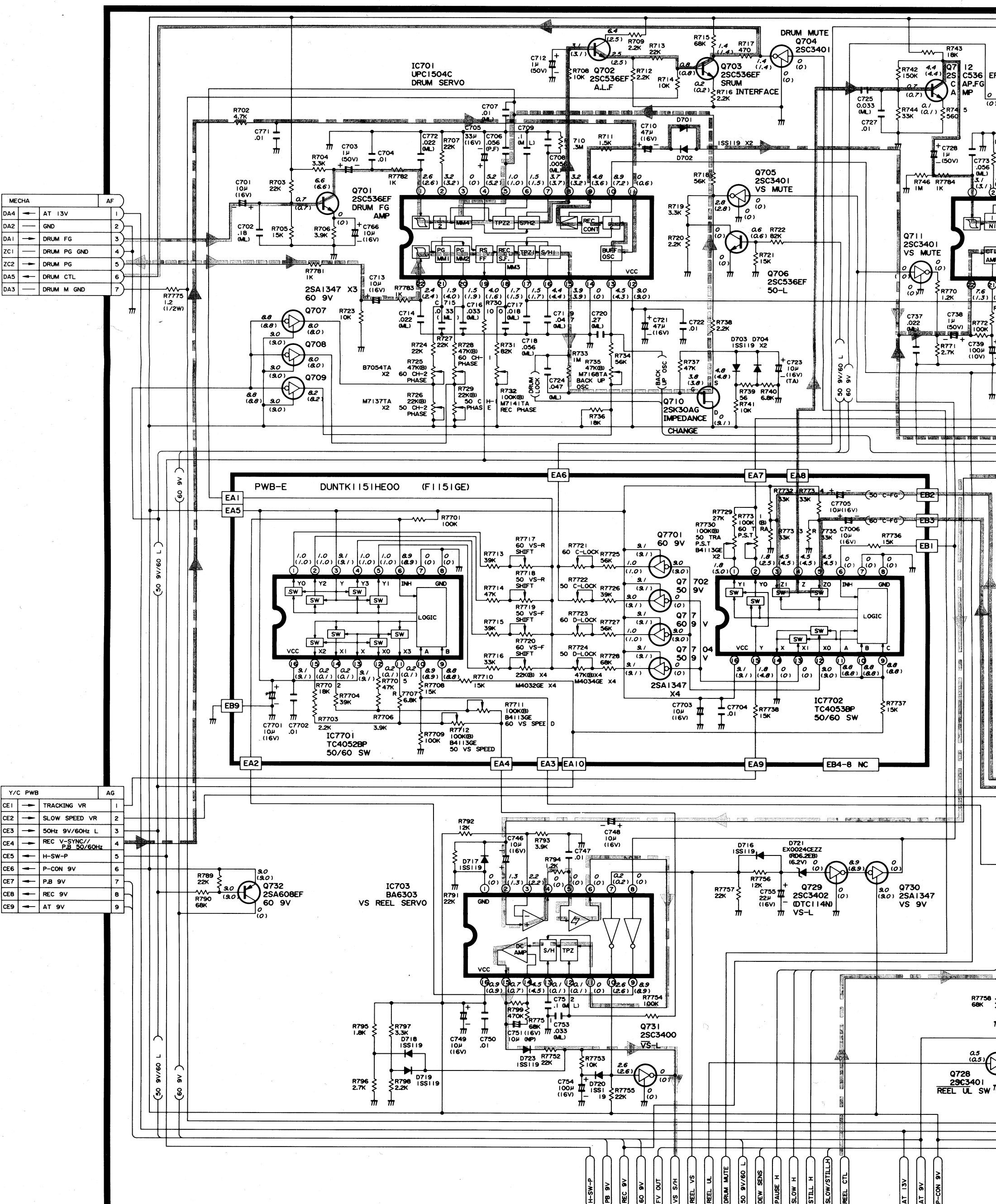


Figure 60.

Capstan servo automatic phase control signal (REC MODE) Drum servo automatic phase control signal
 Drum servo automatic frequency control signal Reel servo automatic frequency control signal

Note: Refer to figure 63 (PWB-A) and 66 (PWB-E) for diagram PWB.

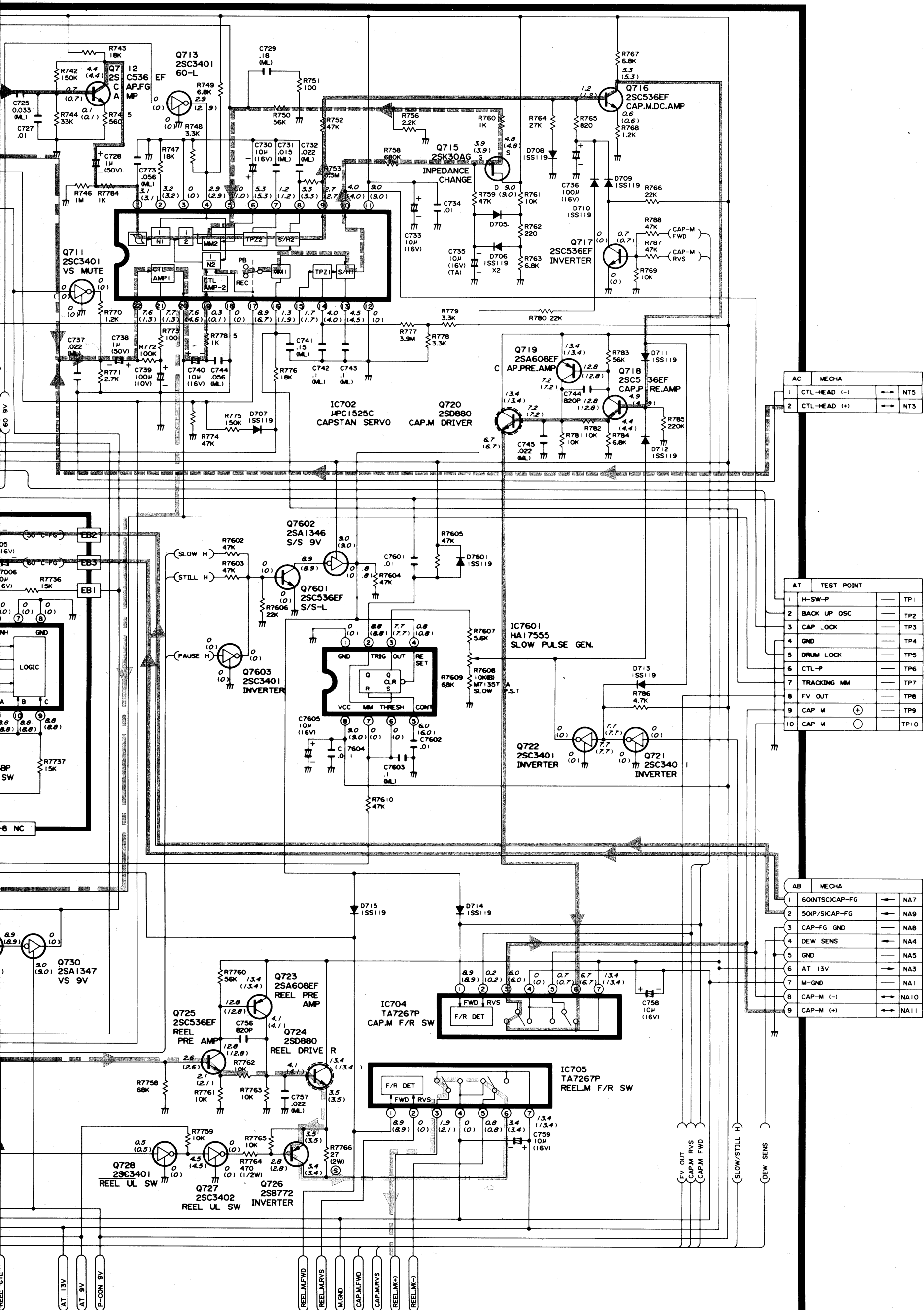


Figure 60.

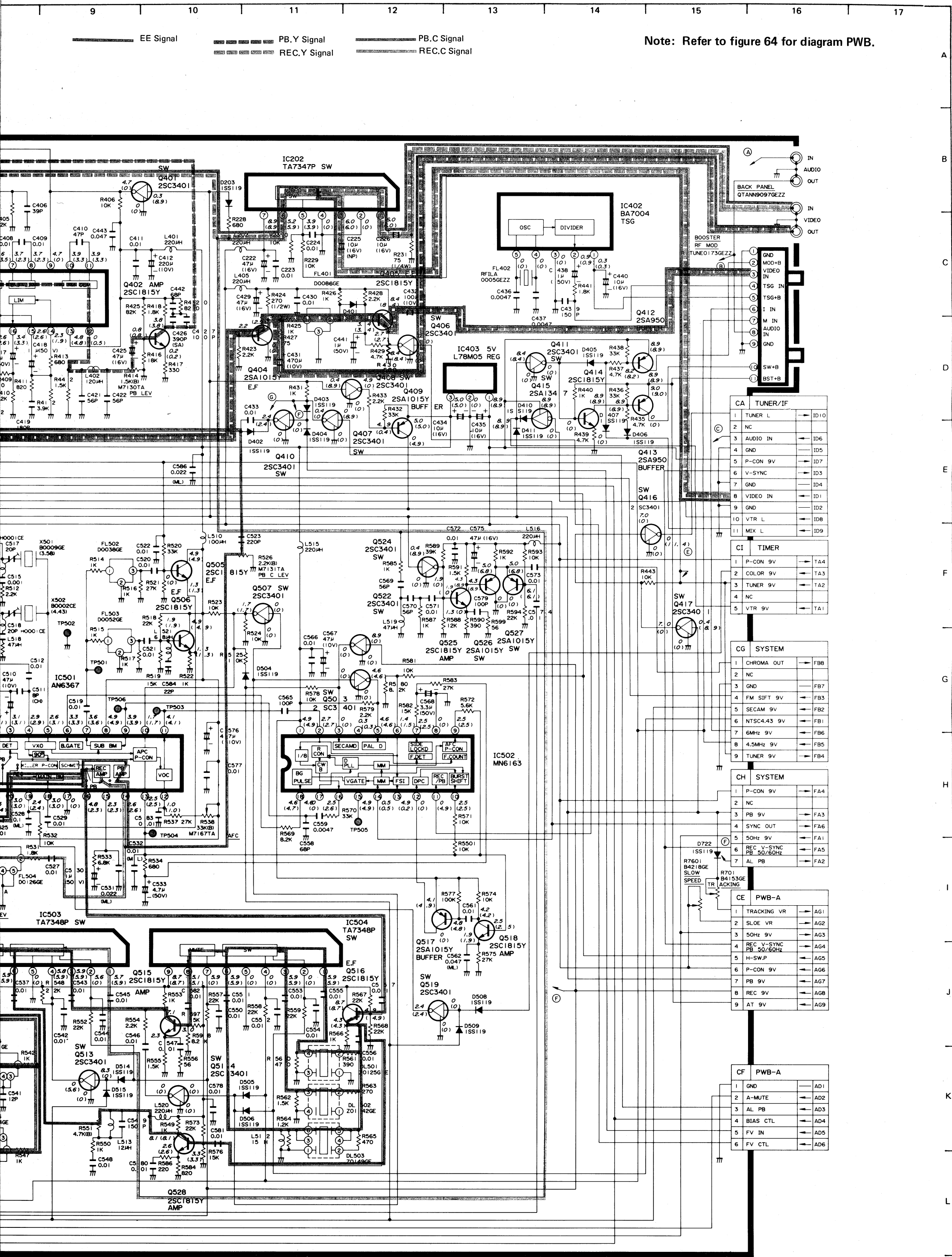


Figure 61.

PWB-B, AUDIO CIRCUIT SCHEMATIC DIAGRAM

Note: Refer to figure 65 for diagram PWB.

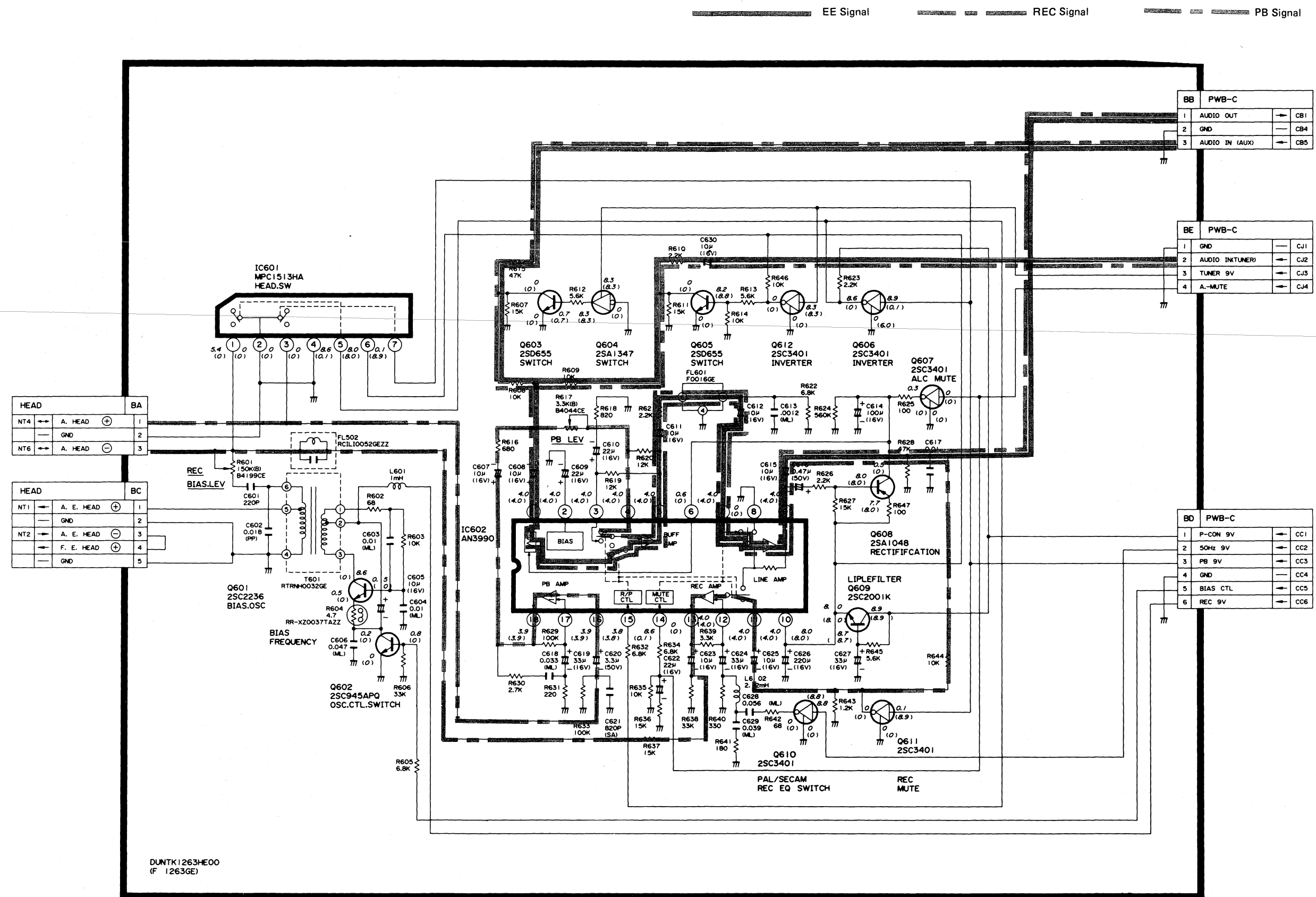


Figure 62.

PWB-A, MECHANICAL CONTROL, SERVO CIRCUIT WIRING SIDE PWB

Note: Refer to figure 59 and 60 for wiring diagram.

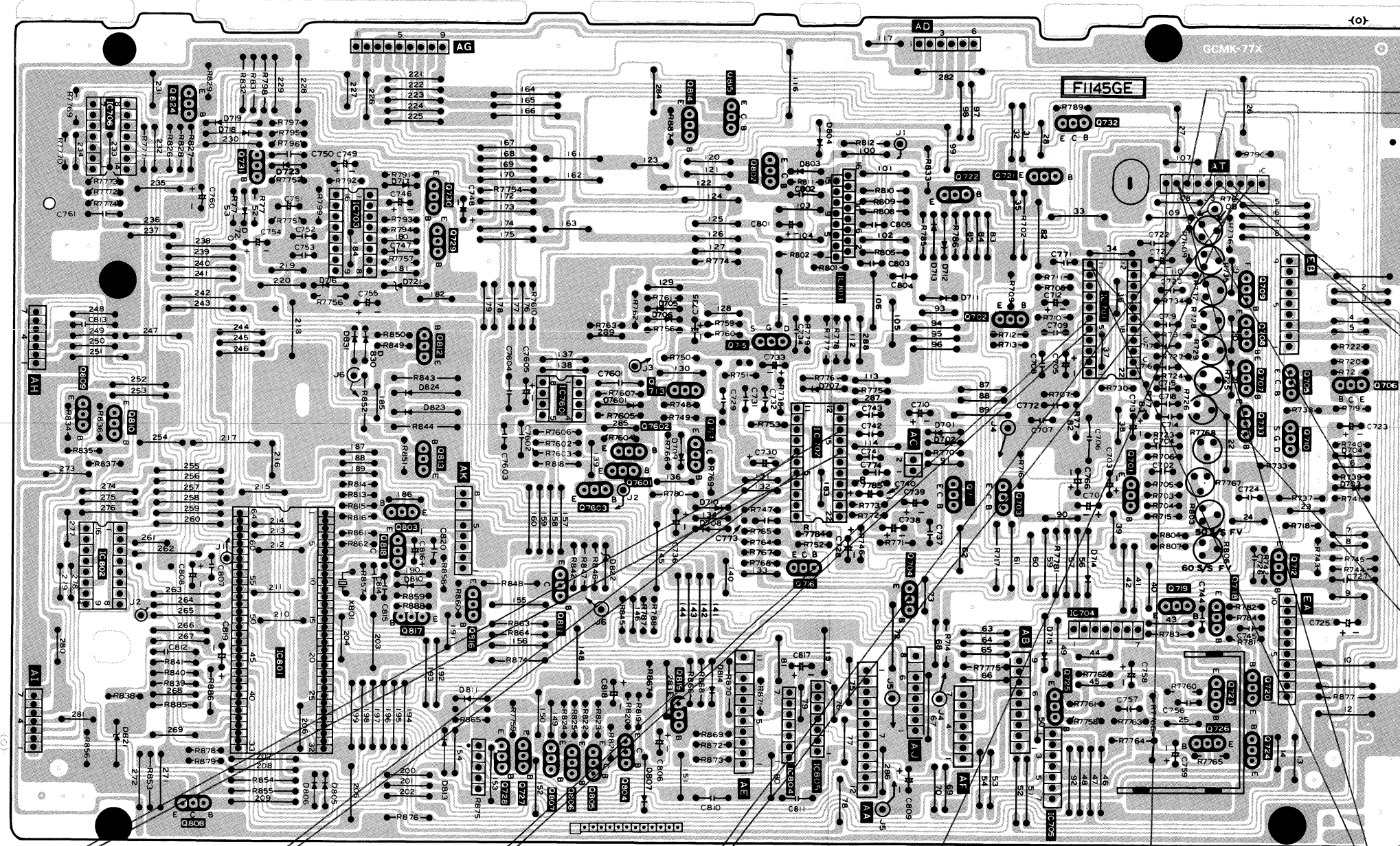
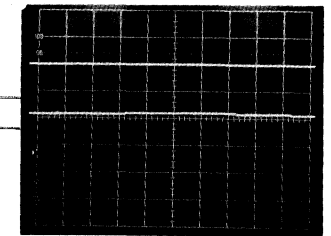
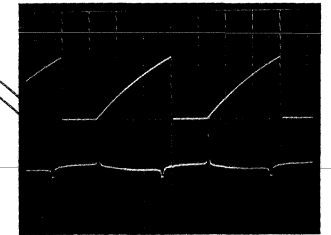


Figure 63.



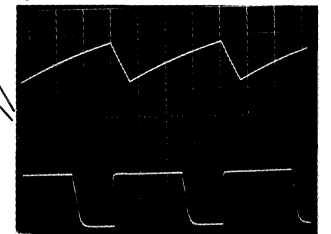
a AT Connector (5) Pin
Drum Lock Voltage
(PB MODE)
2V/div
20ms/div

b AT Connector (3) Pin
Capstan Lock Voltage
(PB MODE)
1V/div
20ms/div



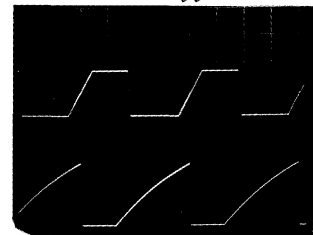
a AT Connector (7) Pin
Tracking MM
(PB MODE)
2V/div
10ms/div

b AT Connector (6) Pin
CTL-P
(PB MODE)
2V/div
10ms/div



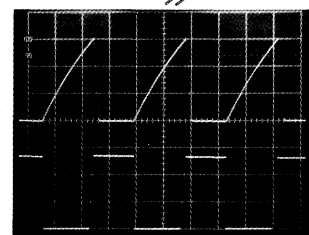
a AT Connector (2) Pin
Back up Osc.
(PB MODE)
2V/div
5ms/div

b IC701 (11) Pin
PB 50Hz
(PB MODE)
500mV/div
5ms/div



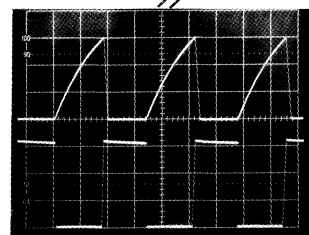
a IC702 (14) Pin
Capstan AFC MM
(PB MODE)
5V/div
10ms/div

b IC702 (16) Pin
(PB MODE)
2V/div
10ms/div



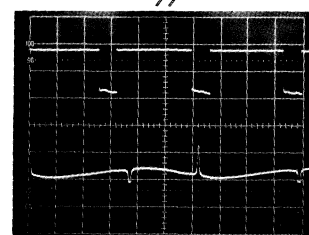
a IC702 (5) Pin
Capstan AFC MM
(PB MODE)
1V/div
2ms/div

b IC702 (7) Pin
Capstan AFC TPZ
(PB MODE)
1V/div
2ms/div



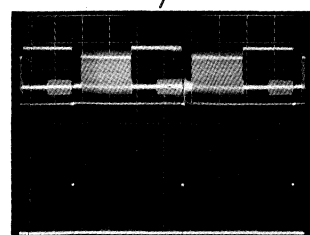
a IC701 (5) Pin
Drum AFC MM
(PB MODE)
1V/div
1ms/div

b IC701 (6) Pin
Drum AFC TPZ
(PB MODE)
1V/div
1ms/div



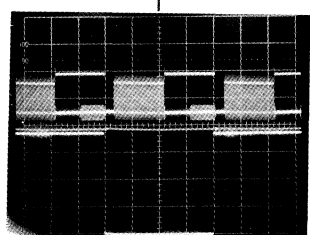
a AT Connector (9) Pin
Slow Drive pulse
(PB SLOW MODE)
2V/div
5ms/div

b AT Connector (6) Pin
CTL-P
(PB SLOW MODE)
2V/div
5ms/div



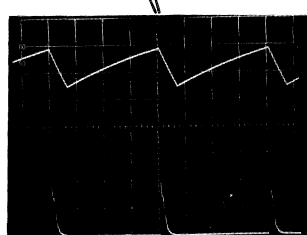
a Video Terminal Output
(PB STILL MODE)
1V/div
5ms/div

b AT Connector (8) Pin
FV Output
(PB STILL MODE)
5V/div
5ms/div



a Video Terminal Output
(PB MODE)
1V/div
5ms/div

b AT Connector (1) Pin
H-SW-P
(PB MODE)
2V/div
5ms/div

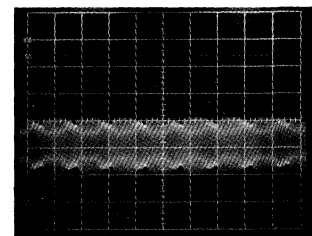


a AT Connector (2) Pin
Back up Osc.
(REC MODE)
2V/div
5ms/div

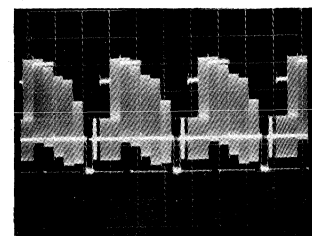
b IC701 (1) Pin
V-SYNC.
(REC MODE)
500mV/div
5ms/div

PWB-C, Y/C AUDIO CIRCUIT WIRING SIDE PWB

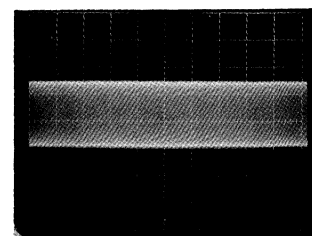
Note: Refer to figure 61 for wiring diagram.



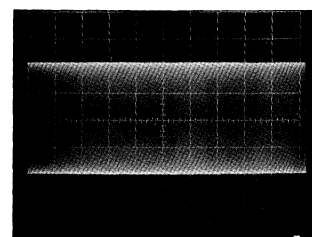
TP302 GND, TP301 HOT
REC. Current
50mV/div
50μs/div



Video Out
500mV/div
20μs/div



Q506 Emitter
REC 5.06MHz
50mV/div
500μs/div



IC501 (4) Pin
REC 4.4336MHz
50mV/div
2ms/div

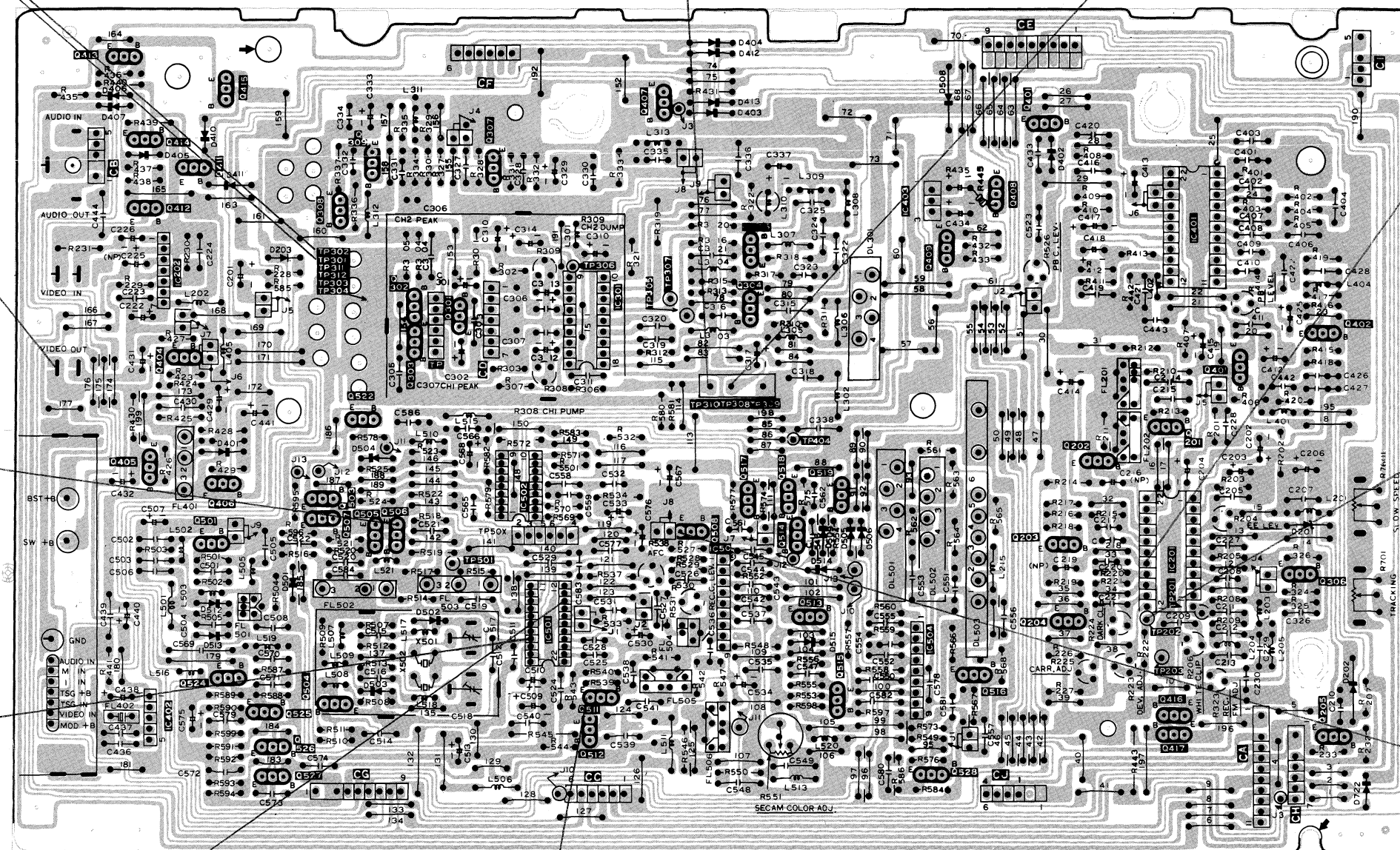
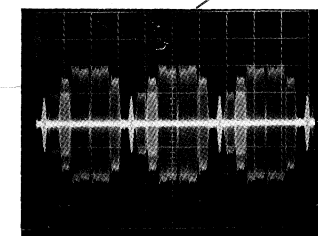
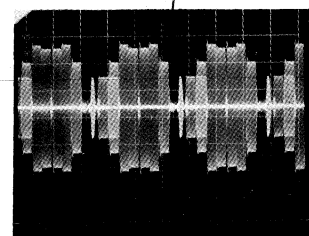


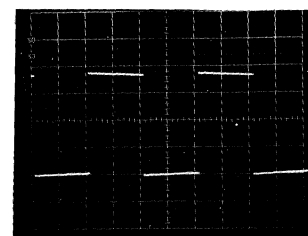
Figure 64.



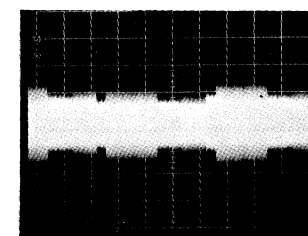
IC501 (14) Pin
PB, Chroma
200mV/div
20μs/div



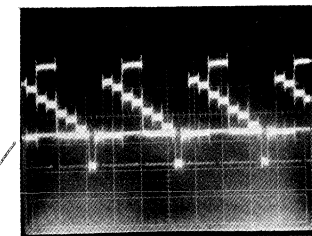
Q511 Emitter
CHOMA ACC
50mV/div
20μs/div



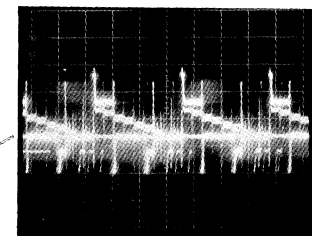
TP310
Switching Pulse
2V/div
10ms/div



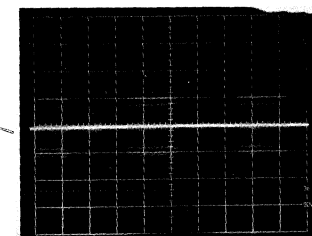
TP308
PB. FM
100mV/div
5ms/div



IC201 (16) Pin
REC. Y Signal
0.1V/div
20μs/div



TP202
Pre-emphasis
200mV/div
20μs/div



Q508 Emitter
REC Chroma
100mV/div
5ms/div

PWB-B, AUDIO CIRCUIT WIRING SIDE PWB

Note: Refer to figure 62 for wiring diagram.

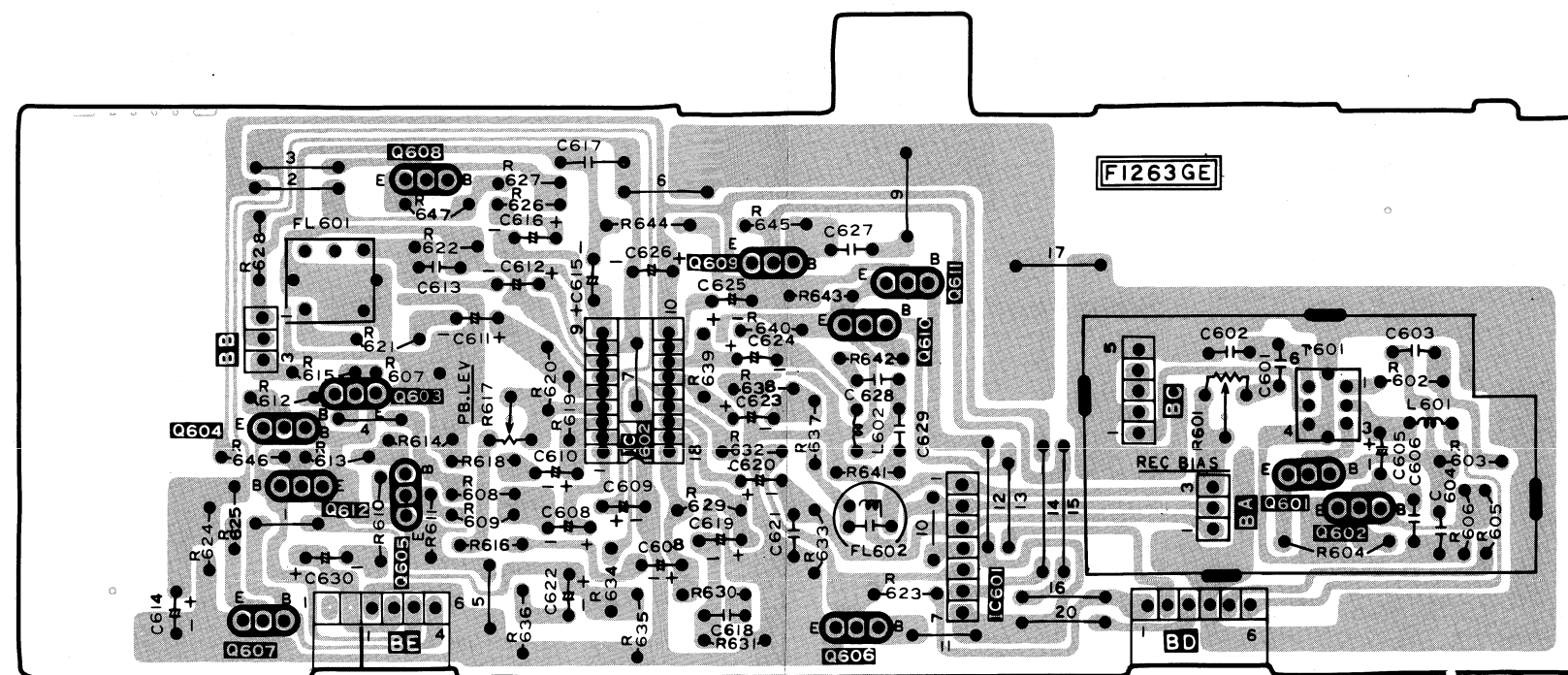


Figure 65.

PWB-E, SERVO SUB SWITCHING CIRCUIT WIRING SIDE PWB

Note: Refer to figure 60 for wiring diagram.

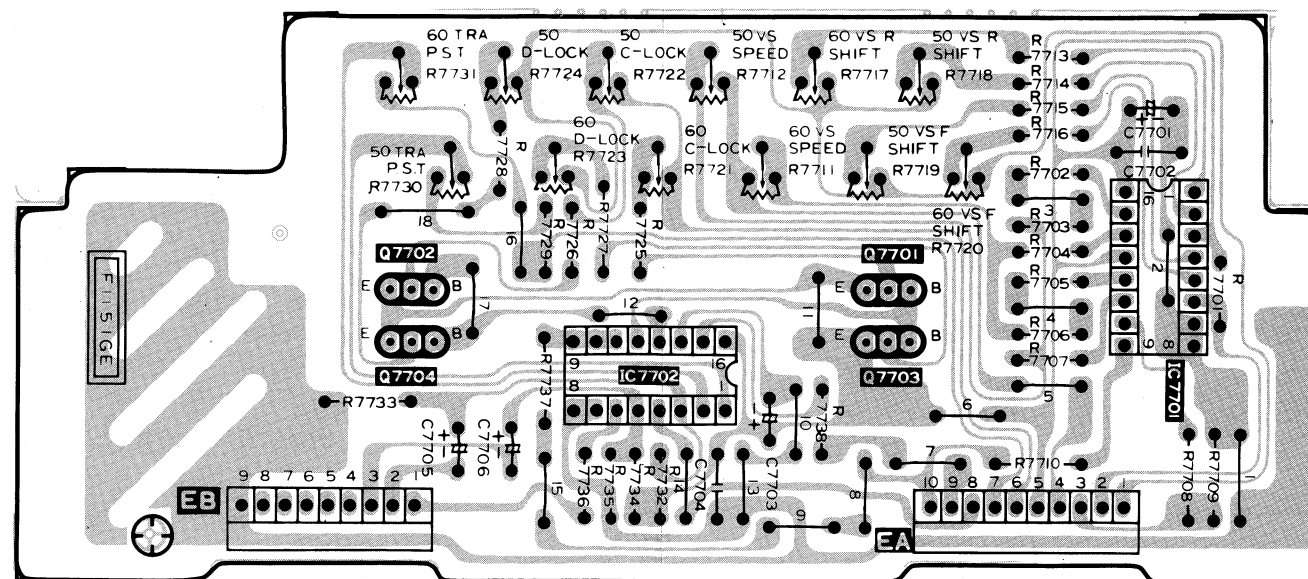
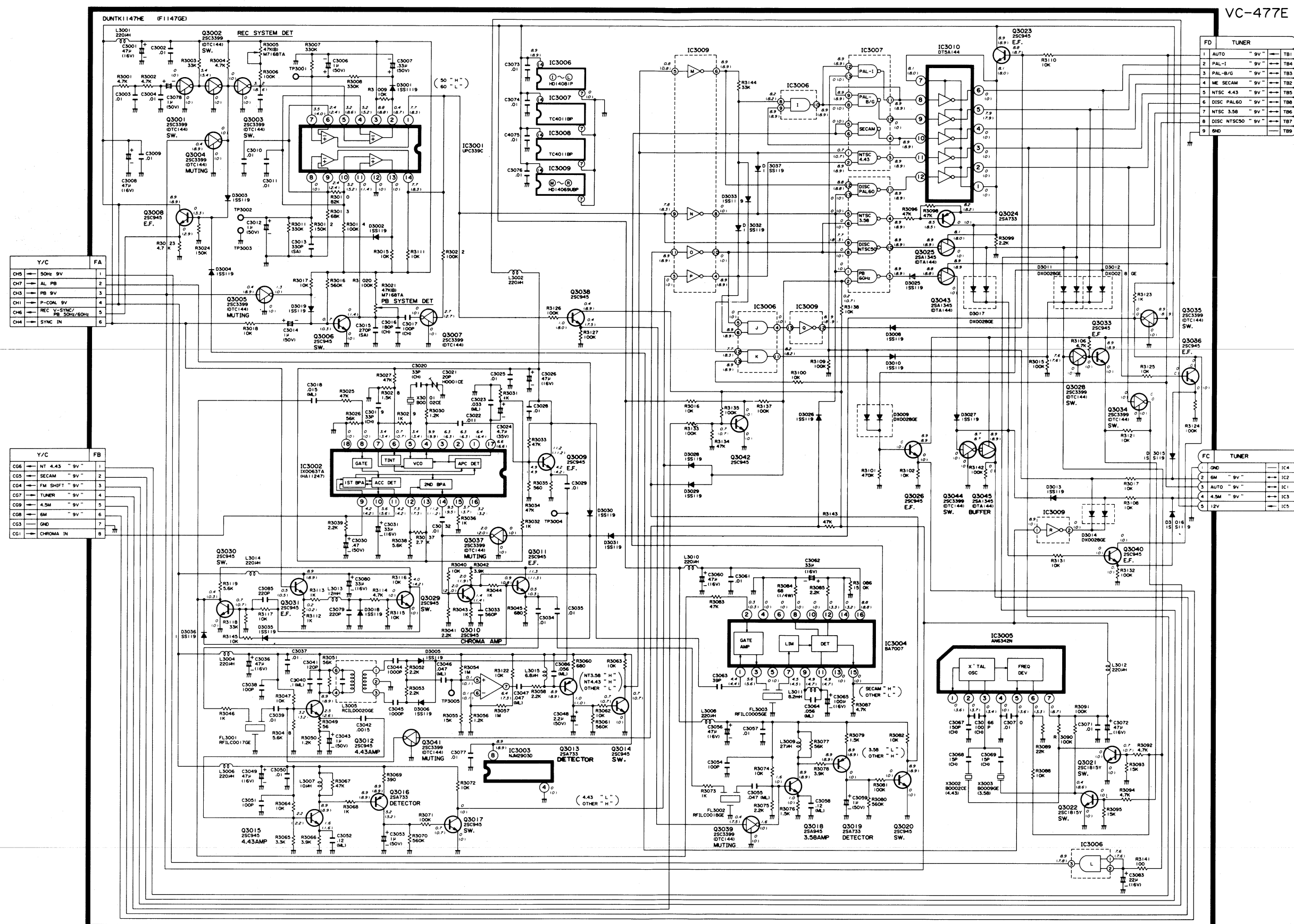
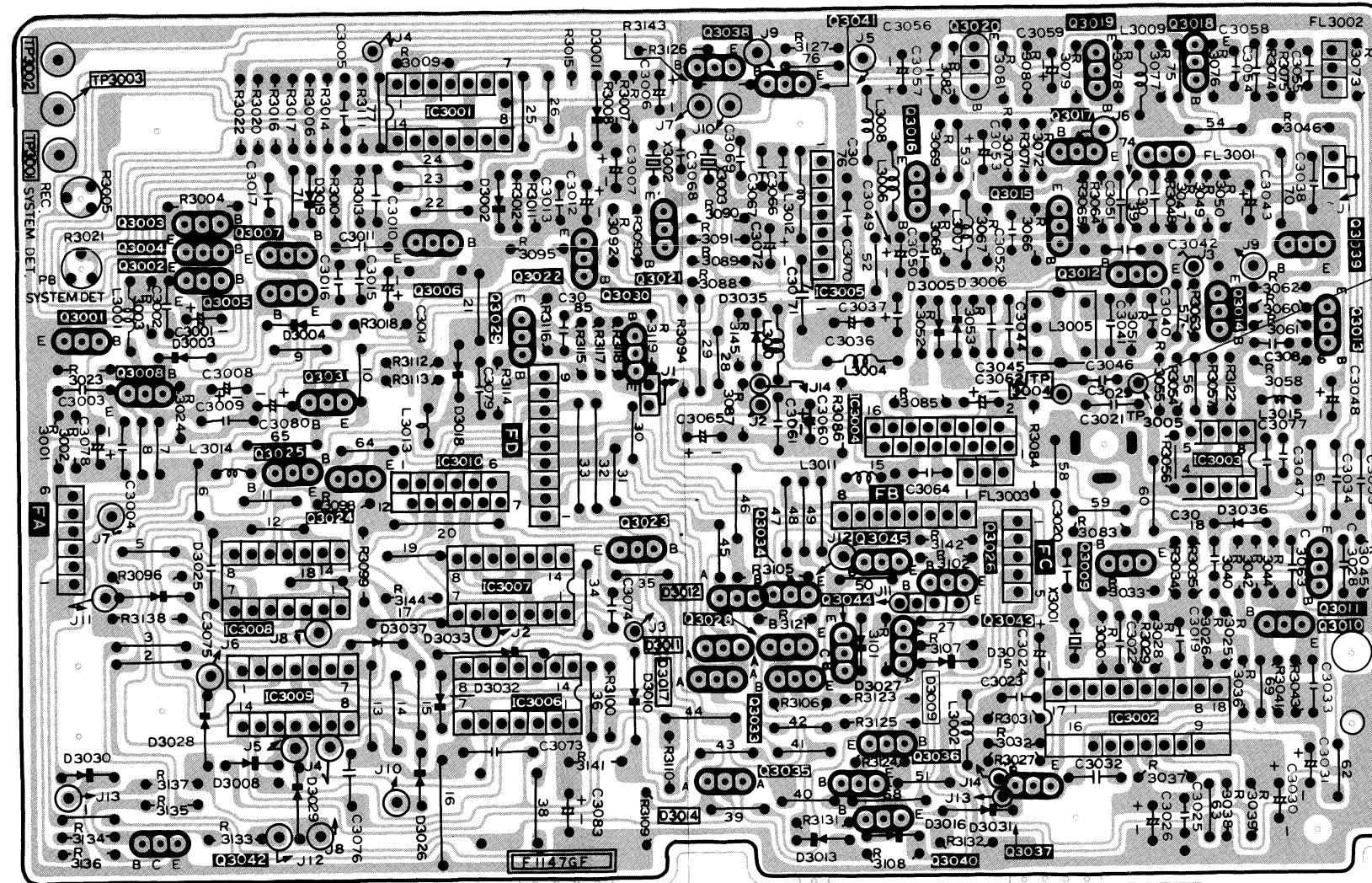


Figure 66.

PWB-F, SYSTEM MODE CIRCUIT SCHEMATIC DIAGRAM



[illegible]

TP3005
PAL. Color bar
0.1 V/div
20 μ s/div

Figure 68.

PWB-H, OPERATION CIRCUIT SCHEMATIC DIAGRAM AND WIRING SIDE PWB

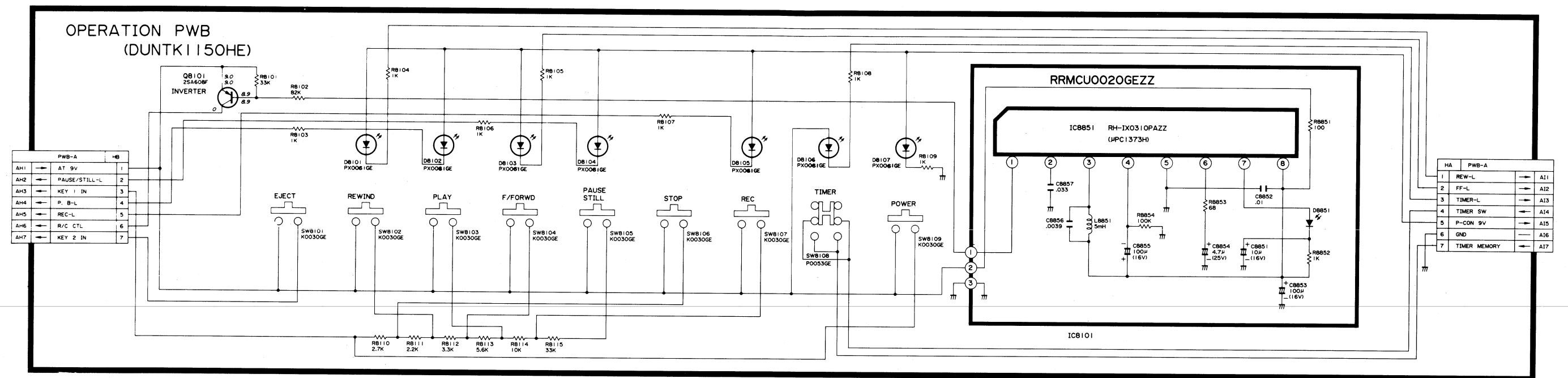


Figure 69.

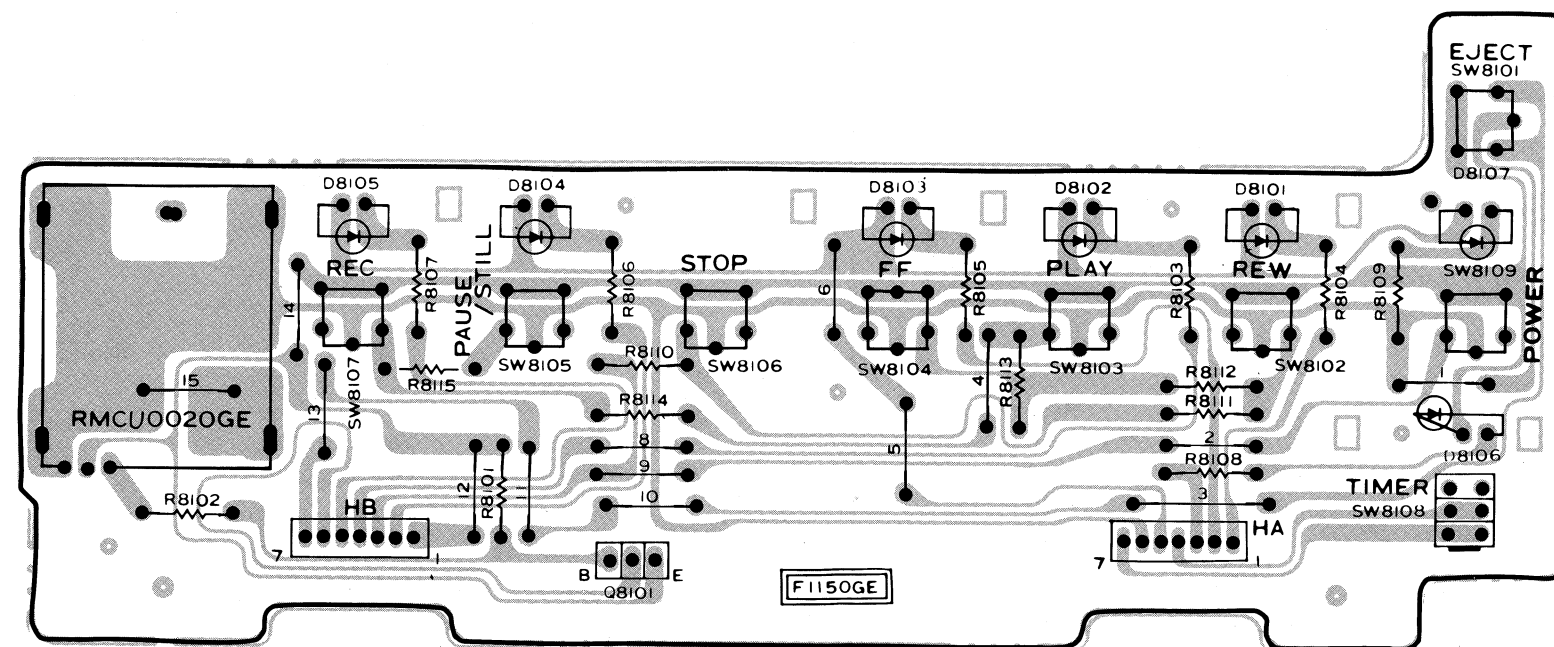


Figure 70.

[illegible]

63

PWB-T, TIMER, CHANNEL SELECTOR CIRCUIT SCHEMATIC DIAGRAM AND WIRING SIDE PWB

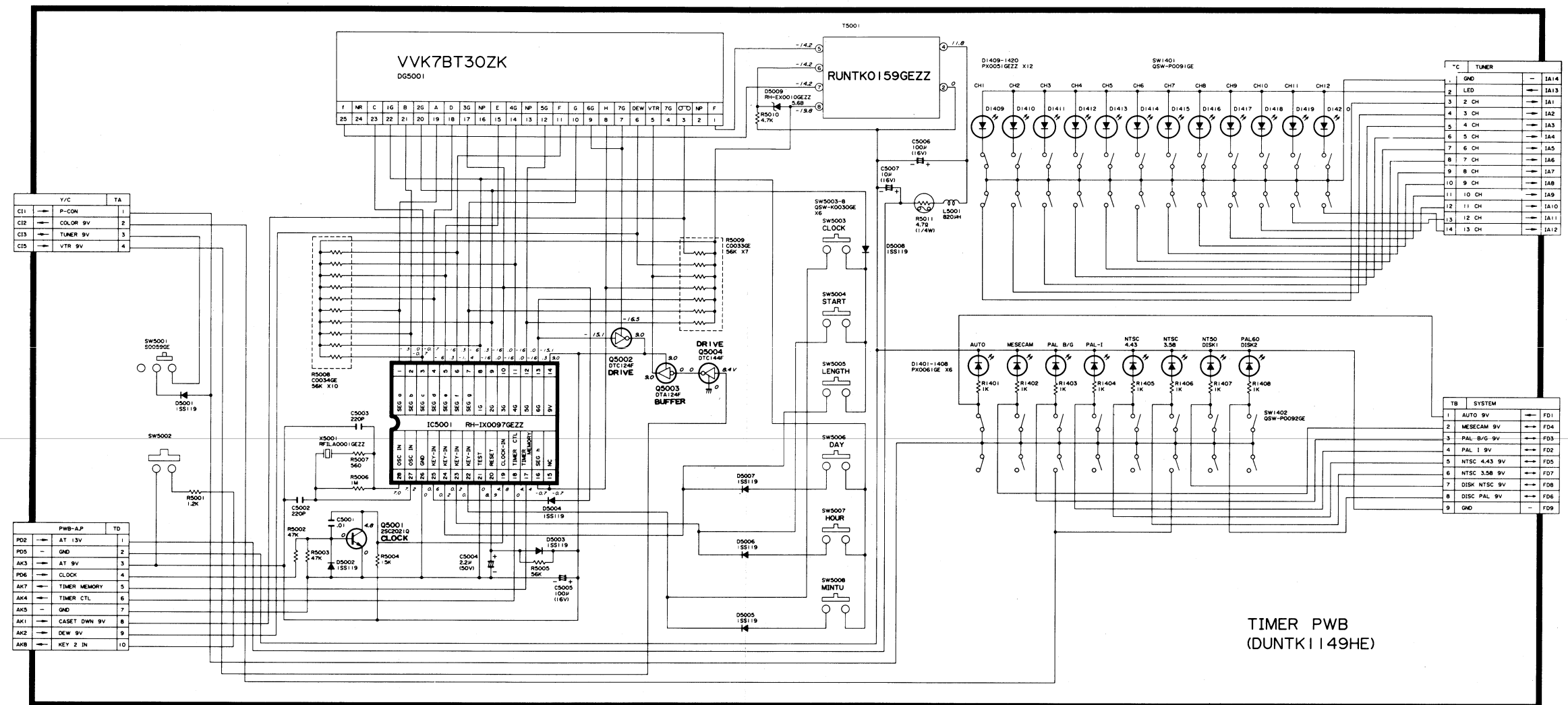


Figure 73.

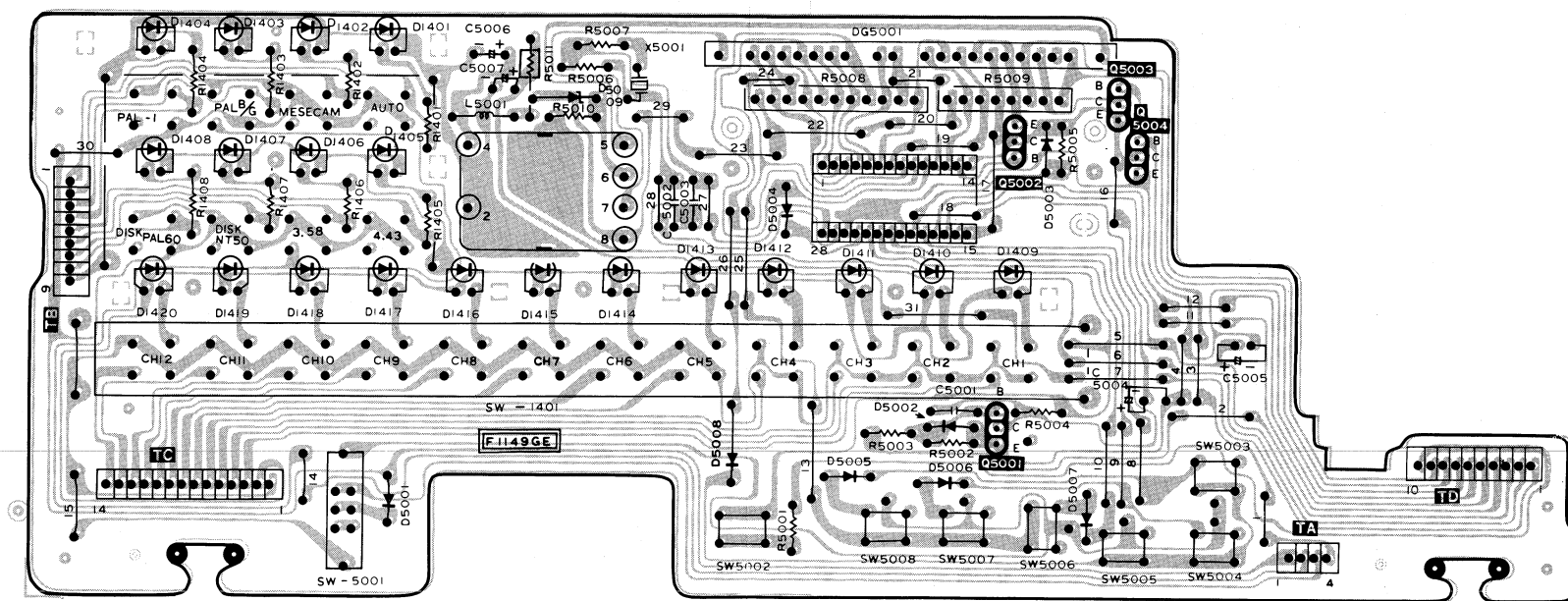


Figure 74.

A vertical scale with labels A, B, C, D, E, F, G, and H from top to bottom, with horizontal tick marks.

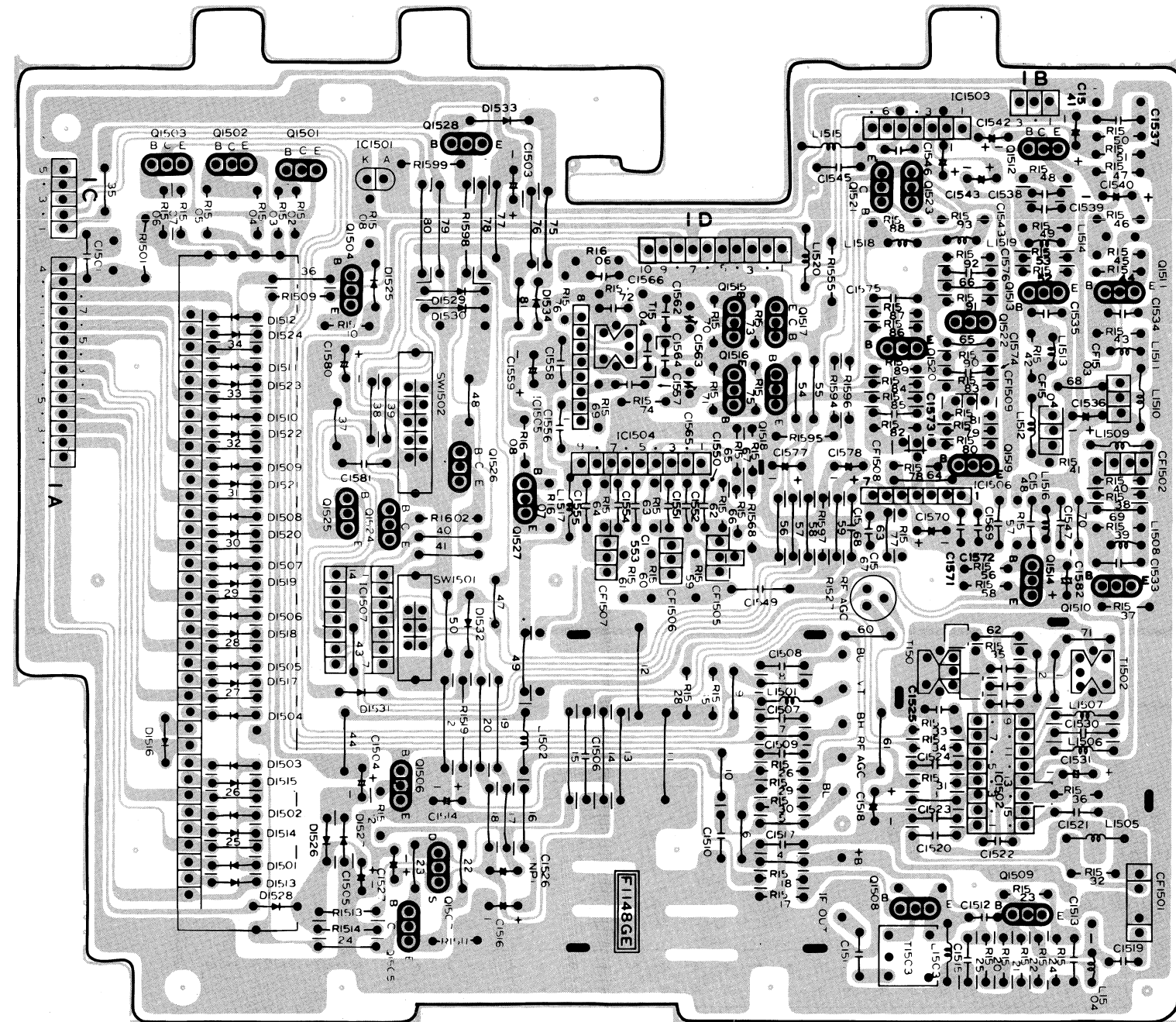
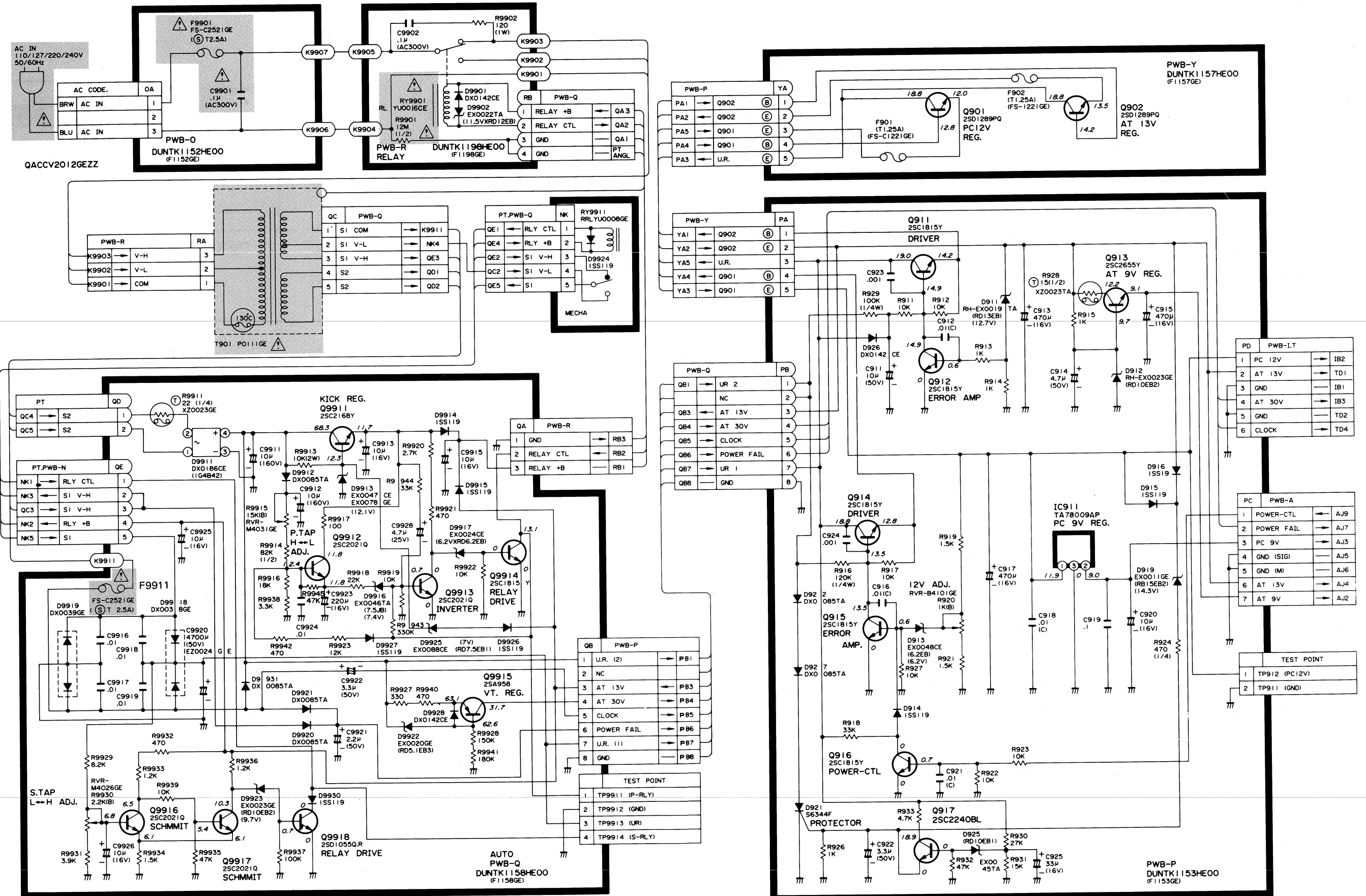


Figure 72.

POWER CIRCUIT SCHEMATIC DIAGRAM



POWER CIRCUIT WIRING SIDE PWB.



RF CONVERTER

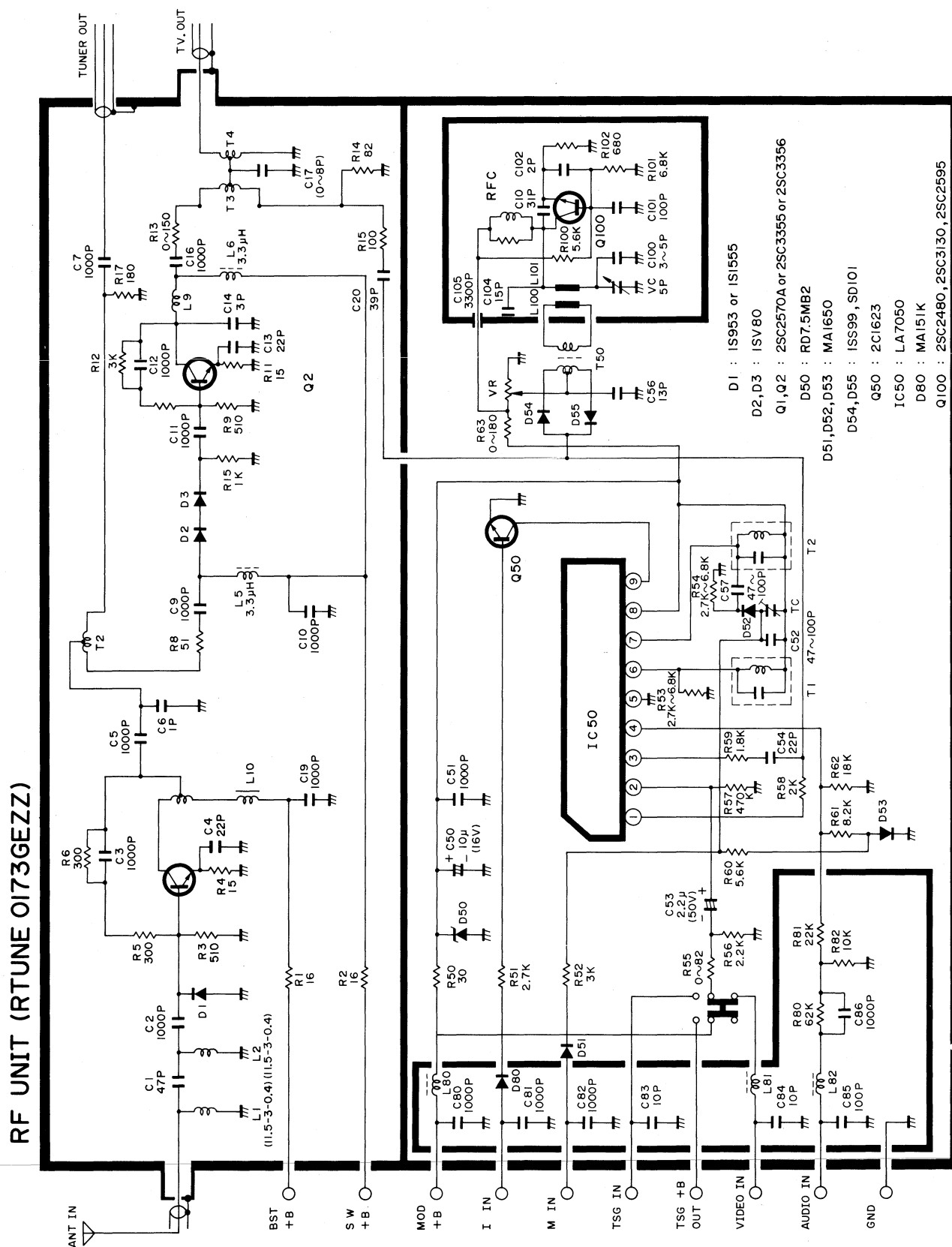


Figure 81.

TUNER SCHEMATIC DIAGRAM

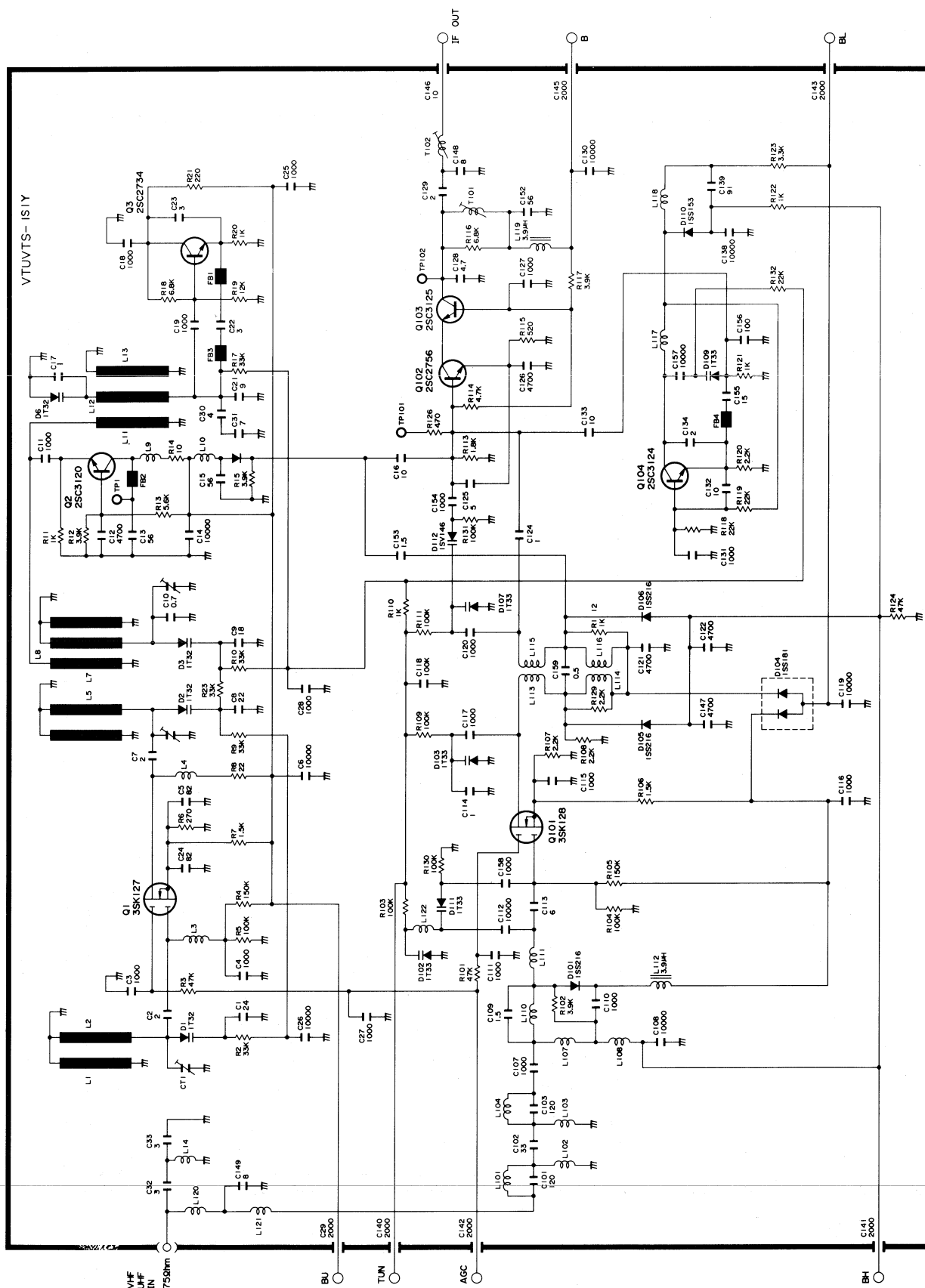


Figure 82.

PARTS LIST

PARTS REPLACEMENT

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by Δ in the Replacement Parts Lists.

The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

PARTS LIST				REF. NO.	PART NO.	DESCRIPTION	CODE
PARTS REPLACEMENT				Q722	VS2SC3401 / - 1	Slow/Still-L Inverter	AD
				Q723	VS2SA608F / - 1E	Reel PRE Amplifier	AB
				Q724	VS2SD880 - Y / - 1	Reel Driver	AF
				Q725	VS2SC536F / - 1E	Reel PRE Amplifier	AB
				Q726	VS2SB772 - PQ - 1	Reel UL Inverter	AD
				Q727	VS2SC3402 / - 1	Reel UL Inverter	AB
				Q728	VS2SC3401 / - 1	Reel UL Switch	AD
				Q729	VSDTC114N / - 1	VS-L Inverter	AB
				Q730	VS2SA1347 / - 1	VS 9V, Switch	AB
				Q731	VS2SC3400 / - 1	VS-L, Inverter	AB
				Q732	VS2SA608EF / - 1	60Hz (NTSC), 9V, Switch	AC
				Q733	VS2SA1347 / - 1	60Hz (NTSC), 9V, Switch	AB
				Q802	VS2SC3401 / - 1	Slow/Still-L Inverter	AD
				Q803	VS2SC536F / - 1	Drum Mute Inverter	AB
				Q804	VS2SC536F / - 1	Dew Sensor Amplifier	AB
				Q805	VS2SC536EF / - 1	Dew Sensor Amplifier	AC
				Q806	VS2SC536EF / - 1	Dew Sensor Inverter	AC
				Q807	VS2SA1346 / - 1	Dew 9V, Switch	AB
				Q808	VS2SC3402 / - 1	REW-L	AB
				Q809	VS2SA950 - Y / 1E	Play Back 9V	AD
				Q810	VS2SA950 - Y / 1E	REC. 9V	AD
				Q811	VS2SC536F / - 1	Power Fail Inverter	AB
				Q812	VS2SD1286K / - 1	Sup. Brake H Inverter	AH
				Q813	VS2SD1286K / - 1	Take Up Reel Brake H. Inverter	AH
				Q814	VS2SC3401 / - 1	Bias Control Inverter	AD
				Q815	VS2SA1346 / - 1	Bias Control 9V, Buffer	AB
				Q816	VS2SA1346 / - 1	CST Down 9V, Switch	AB
				Q817	VS2SA608EF / - 1	P-Initial Pulse	AC
				Q818	VS2SC3401 / - 1	P-Initial Pulse Inverter	AD
				Q819	VS2SC536EF / - 1	Reel Pulse Buffer	AC
				Q824	VS2SC536EF / - 1	Reel FF/REW Switch	AC
				Q7601	VS2SC536EF / - 1	Slow/Still-L Inverter	AC
				Q7602	VS2SA1346 / - 1	Slow/Still-9V Switch	AB
				Q7603	VS2SC3401 / - 1	Pause-L Inverter	AD
				INTEGRATED CIRCUITS			
				IC701	VHi UPC1504C - 1	Drum Servo	AR
				IC702	VHi UPC1502C - 1	Capstan Servo	AS
				IC703	VHi BA6303 / - 1	VS Reel Servo	AK
				IC704	VHi TA7267P / - 1	Capstan M. F/R Switch	AL
				IC705	VHi TA7267P / - 1	Reel M. F/R Switch	AL
				IC706	VHi UPD4066B - 1	Reel M. Switch	AL
				IC801	RH- i X0112GEZZ	System Control	AT
				IC802	RH- TD62105 / - 1	Inverter	AK
				IC803	RH- BAL6309 / - 1	FV. Pulse	AP
				IC804	RH- TA7267P / - 1	CST-M Driver	AL
				IC805	RH- TA7267P / - 1	L.D.M. Driver	AL
				IC7601	RH- HA17555P - 1	Slow Pulse Generator	AH
				DIODES			
				D701	VHD1SS119 / - 1	Diode (1SS119)	AB
				720			
				D721	RH- EX0024CEZZ	Zener Diode (RD 6.2EB)	AB
				PWB-A			
				TRANSISTORS			
Q701	VS2SC536EF / - 1	Drum FG Amplifier	AC				
Q702	VS2SC536EF / - 1	A.L.F.	AC				
Q703	VS2SC536EF / - 1	Drum Interface	AC				
Q704	VS2SC3401 / - 1	Drum Mute	AD				
Q705	VS2SC3401 / - 1	VS Mute	AD				
Q706	VS2SC536EF / - 1	50Hz (P/S)-L Inverter	AC				
Q707	VS2SA1347 / - 1	60Hz (NTSC) 9V Switch	AB				
Q708	VS2SA1347 / - 1	60Hz (NTSC) 9V Switch	AB				
Q709	VS2SA1347 / - 1	60Hz (NTSC) 9V Switch	AB				
Q710	VS2SK30AG / - 2E	Impedance Change	AD				
Q711	VS2SC3401 / - 1	VS Mute	AD				
Q712	VS2SC536EF / - 1	Capstan FG Amplifier	AC				
Q713	VS2SC3401 / - 1	60Hz (NTSC)-L Inverter	AD				
Q715	VS2SK30AG / - 2E	Impedance Change	AD				
Q716	VS2SC536EF / - 1	Capstan M.D.C. Amplifier	AC				
Q717	VS2SC536EF / - 1	Inverter	AC				
Q718	VS2SC536EF / - 1	Capstan PRE. Amplifier	AC				
Q719	VS2SA608F / - 1E	Capstan PRE. Amplifier	AB				
Q720	VS2SD880 - Y / - 1	Capstan M Driver	AF				
Q721	VS2SC3401 / - 1	Slow/Still-L Inverter	AD				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
D723, 803, 807, 810, 811, 813, 814	VHD1SS119 / - 1	Diode (1SS119)	AB	PWB-B			
D821	RH-EX0060CEZZ	Zener Diode (RD 4.7EB)	AB	TRANSISTORS			
D822	RH-EX0024CEZZ	Zener Diode (RD 6.2EB)	AB	Q601	VS2SC2236Y / - 1	Bias Osc.	AD
D823, 824	VHDERB1201 / - 1	Diode (ERB1201)	AB	Q602	VS2SC945APQ1E	Osc. Control Switch	AB
D830, 831	RH-DX0142CEZZ	Diode (1SS133)	AB	Q603	VS2SD655-D / - 1	Switch	AC
D7601	VHD1SS119 / - 1	Diode (1SS119)	AB	Q604	VS2SA1347 / - 1	Switch	AB
CAPACITORS				Q605	VS2SD655-D / - 1	Switch	AC
C723	VCSATA1CE106K	10 μ F, 16V, Tantalum	AD	Q606	VS2SC3401 / - 1	Inverter	AD
C735	VCSATA1CE106K	10 μ F, 16V, Tantalum	AD	Q607	VS2SC3401 / - 1	ALC Mute	AD
C736	RC-EZ0042GEZZ	100 μ F, 16V, Electrolytic	AC	Q608	VS2SA1048Y / 1E	Rectification	AB
C739	VCEAAA1AW107M	100 μ F, 10V, Electrolytic	AB	Q609	VS2SC2001-K-1	Lipfilter	AD
C751	VCE9AA1CW106M	10 μ F, 16V, Nonpolar	AB	Q610	VS2SC3401 / - 1	PAL/Secam, REC, EQ, Switch	AD
C754	RC-EZ0020GEZZ	100 μ F, 16V, Electrolytic	AC	Q611	VS2SC3401 / - 1	REC Mute	AD
C808	RC-EZ0042GEZZ	100 μ F, 16V, Electrolytic	AC	Q612	VS2SC3401 / - 1	Inverter Enter	AD
C809	RC-EZ0025GEZZ	470 μ F, 16V, Electrolytic	AC	INTEGRATED CIRCUITS			
CONTROLS				IC601	VHi UPC1513H-1	Head Switch	AH
R723	RVR-M7141TAZZ	100k ohm, Pot., REC Phase	AC	IC602	VHi AN3990 / - 1	Audio Universal IC.	AK
R725	RVR-B7054TAZZ	47k ohm, Pot., CH-2 Phase	AD	CAPACITORS			
R726	RVR-M7137TAZZ	22k ohm, Pot., CH-2 Phase	AC	C614	VCEADA1CW107M	100 μ F, 16V, Electrolytic	AC
R728	RVR-B7054TAZZ	47k ohm, Pot., CH-1 Phase	AD	C626	RC-EZ0129TAZZ	220 μ F, 16V, Electrolytic	AC
R729	RVR-M7137TAZZ	22k ohm, Pot., CH-1 Phase	AC	CONTROLS			
R735	RVR-M7168TAZZ	47k ohm, Pot., Back Up Osc.	AE	R601	RVR-B4199CEZZ	150k ohm, Pot., REC Bias, LEV.	AC
R803	RVR-M7141TAZZ	100k ohm, Pot., S/S FV	AC	R617	RVR-B4044CEZZ	3.3k ohm, Pot., PB LEV.	AC
R806	RVR-M7141TAZZ	100k ohm, Pot., S/S FV	AC	RESISTOR			
R7608	RVR-M7135TAZZ	10k ohm, Pot., A Slow P.S.T.	AC	R604	RR-XZ0037TAZZ	4.7 ohm, Fuse Resistor	AB
R7767	RVR-M7129TAZZ	1k ohm, Pot., 50 NS TRQ.	AC	COILS AND TRANSFORMERS			
R7768	RVR-M7133TAZZ	4.7k ohm, Pot., 60 NS TRQ.	AC	L601	RCiLP0002GEZZ	1MHz	AC
RESISTORS				L602	RCiLP0008GEZZ	2.2MHz	AD
R843, 844	VRS-VV3DB390J	39 ohm, 2W, 5%, Metal Oxide	AA	FL601	RCiLF0016GEZZ	Low Pass Filter	AE
R875	RMPTC0010GEZZ	22k ohm x 4, Packaged Circuit	AB	FL602	RCiLi0052GEZZ	70kHz, Trap	AG
R7766	VRS-VV3DB270J	27 ohm, 2W, 5%, Metal Oxide	AA	T601	RTRNH0032GEZZ	Osc. Transformer	AE
MISCELLANEOUS				MISCELLANEOUS			
X801	RFiLA0001GEZZ	Filter	AF	BA	QPLGN0346GEZZ	Plug (3 Pin)	AA
AC	QPLGN0246GEZZ	Plug (2 Pin)	AA	BB	QPLGN0346GEZZ	Plug (3 Pin)	AA
EB	QPLGN0925CEZZ	Plug (9 Pin)	AD	BC	QPLGN0546GEZZ	Plug (5 Pin)	AB
EA	QPLGN1025CEZZ	Plug (10 Pin)	AD				
AT	QPLGN1025CEZZ	Plug (10 Pin)	AD				
AA	QPLGN1246GEZZ	Plug (12 Pin)	AD				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
PWB-C				IC301	VHi AN6326N/ - 1	PB Pre Amplifier, AGC, DOC	AR
TRANSISTORS				IC401	VHi AN6337/ - 1	Y-Signal Processor (Limiter, FM Demodulator, Noise Cancel SYNC. Sep)	AW
Q201	VS2SC1815YW- 1	L.P.F. Switching	AC	IC402	VHi BA7004/ - 1	Test Signal Generator	AK
Q202	VS2SA1015Y/ 1E	Emitter Follower	AC	IC403	VHi L78M05/ - 1	5V Regulator	AG
Q203	VS2SA1015Y/ 1E	Emitter Follower	AC	IC501	VHi AN6367/ - 1	Color Signal Processor (ACC. APC. Killer BM)	AV
Q204	VS2SC3401/ - 1	FM CARR. Switching	AD	IC502	VHi MN6163/ - 1	Color Signal Processor (AFC. Side Lock DET)	AT
Q205	VS2SC1815YW- 1	Switching	AC	IC503	VHi TA7348P/ - 1	Switching (Color Signal Switching)	AK
Q301	VS2SC1815YW- 1	Head Switching (PB ON)	AC	IC504	VHi TA7348P/ - 1	Switching (Color Signal Switching)	AK
Q302	VS2SC1815YW- 1	Head Switching (REC ON)	AC	DIODES			
Q303	VS2SC1815YW1E	Head Switching (REC ON)	AB	D201	RH- EX0012GEZZ	Zener Diode (3.6V)	AB
Q304	VS2SC1815YW1E	Emitter Follower	AB	D202	VHD1N34A/ - 1	Diode (1N34A)	AB
Q305	VS2SC1815YW- 1	P.B. FM EQ Amplifier	AC	D203,	VHD1SS119/ - 1	Diode (1SS119)	AB
Q306	VS2SC1815YW- 1	Emitter Follower	AC	401,			
Q307	VS2SC1815YW- 1	REC. Amplifier	AC	407,			
Q308	VS2SC1815YW- 1	REC. Amplifier	AC	410,			
Q309	VS2SA1015Y/ 1E	REC. Amplifier	AC	413,			
Q401	VS2SC3401/ - 1	Switching (PB ON)	AD	416,			
Q402	VS2SC1815YW- 1	PB. Video Amplifier	AC	417,			
Q404	VS2SA1015Y/ 1E	Emitter Follower	AC	501,			
Q405	VS2SC1815YW- 1	Emitter Follower	AC	506,			
Q406	VS2SC3401/ - 1	Switching (Trick Play ON)	AD	508,			
Q407	VS2SC3401/ - 1	Switching (ALPB ON)	AD	509,			
Q408	VS2SC3401/ - 1	Switching (PB ON)	AD	512,			
Q409	VS2SA1015Y/ 1E	Buffer	AC	513,			
Q410	VS2SC3401/ - 1	Switching	AD	514,			
Q411	VS2SC3401/ - 1	Switching	AD	515,			
Q412	VS2SA950- Y/ 1E	Buffer	AD	722			
Q413	VS2SA950- Y/ 1E	Buffer	AD	CAPACITORS			
Q414	VS2SC1815YW- 1	Switching	AC	C201,	VCEADA1AW107M	100μF, 10V, Electrolytic	AC
Q415	VS2SA1347/ - 1	Switching	AB	206			
Q416	VS2SC3401/ - 1	Switching	AD	C216	VCE9AA1HW105M	1μF, 50V, Nonpolar	AB
Q417	VS2SC3401/ - 1	Switching	AD	C219	VCE9AA1HW105M	1μF, 50V, Nonpolar	AB
Q501	VS2SC1815YW- 1	PB Chroma Amplifier	AC	C225	VCE9AA1CW106M	10μF, 16V, Nonpolar	AB
Q503	VS2SC3401/ - 1	Switching (NTSC ON)	AD	C310,	VCEADA1AW107M	100μF, 10V, Electrolytic	AC
Q504	VS2SC3401/ - 1	Switching (NTSC 3.58 ON)	AD	317			
Q505	VS2SC1815YW- 1	Emitter Follower	AC	C412	VCEADA1AW227M	220μF, 10V, Electrolytic	AB
Q506	VS2SC1815YW- 1	Emitter Follower	AC	C431	RC- EZ0025GEZZ	470μF, 10V, Electrolytic	AC
Q507	VS2SC3401/ - 1	Switching (NTSC ON)	AD	C432	VCEADA1AW107M	100μF, 10V, Electrolytic	AC
Q508	VS2SC1815YW- 1	Emitter Follower	AC	CONTROLS			
Q511	VS2SC1815YW- 1	Emitter Follower	AC	R204	RVR- M7168TAZZ	47k ohm, Pot., EE Level	AE
Q512	VS2SC1815YW- 1	Emitter Follower	AC	R206	RVR- M7137TAZZ	22k ohm, Pot., White Clip	AC
Q513	VS2SC3401/ - 1	Switching (Secam, REC ON)	AD	R223	RVR- M7135TAZZ	10k ohm, Pot., DEV. ADJ.	AC
Q514	VS2SC3401/ - 1	Switching (NTSC ON)	AD	R224	RVR- M7137TAZZ	22k ohm, Pot., Dark Clip	AC
Q515	VS2SC1815YW- 1	PB Chroma Amplifier	AC	INTEGRATED CIRCUITS			
Q516	VS2SC1815YW- 1	Emitter Follower	AC	IC201	VHi AN6306/ - 1	Y-Signal Processor (AGC. Pre-Emphasis, Modulator)	AR
Q517	VS2SA1015Y/ 1E	Buffer	AC	IC202	VHi TA7347P/ - 1	Switching (Input Video Signal Switching)	AG
Q518	VS2SC1815YW- 1	Amplifier	AC				
Q519	VS2SC3401/ - 1	Switching (Secam, Color ON)	AD				
Q522	VS2SC3401/ - 1	Switching (REC ON)	AD				
Q524	VS2SC3401/ - 1	Switching (PB ON)	AD				
Q525	VS2SC1815YW- 1	REC Chroma Amplifier	AC				
Q526	VS2SA1015Y/ 1E	Switching (REC ON)	AC				
Q527	VS2SA1015Y/ 1E	Switching (PB ON)	AC				
Q528	VS2SC1815YW- 1	PB Chroma Amplifier	AC				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
R225	RVR - M7135TAZZ	10k ohm, Pot., CARR. ADJ.	AC	L517	VP - MK101K0000	100 μ H	AB
R308	RVR - M7127TAZZ	470k ohm, Pot., CH1 Dump	AC	L518, 519	VP - MK470K0000	47 μ H	AB
R309	RVR - M7127TAZZ	470k ohm, Pot., CH2 Dump	AC	L520	VP - DF221K0000	220 μ H	AB
R323	RVR - M7129TAZZ	1.5k ohm, Pot., REC. FM ADJ.	AC	L521	VP - MK390K0000	39 μ H	AB
R414	RVR - M7130TAZZ	1.5k ohm, Pot., Play Back Level	AC	FL201	RMPTD0152GEZZ	Filter	AG
R526	RVR - M7131TAZZ	2.2k ohm, Pot., Play Back C. Level	AC	FL202	RMPTD0153GEZZ	Filter	AG
R530	RVR - M7131TAZZ	2.2k ohm, Pot., Record C. Level	AC	FL401	RMPTD0086GEZZ	Filter	AG
R538	RVR - M7167TAZZ	33k ohm, Pot., AFC	AE	FL402	RFiLA0005GEZZ	Filter	AE
R551	RVR - B4002CEZZ	4.7k ohm, Pot., Secam Color ADJ.	AC	FL501	RMPTD0120GEZZ	Filter	AF
R701	RVR - B4153CEZZ	200k ohm, Tracking	AD	FL502	RMPTD0038GEZZ	Filter	AH
R7601	RVR - B4218GEZZ	200k ohm, Slow Speed	AD	FL503	RMPTD0052GEZZ	Filter	AG
				FL504	RMPTD0126GEZZ	Filter	AK
				FL505	RMPTD0131GEZZ	Filter	AK
				FL506	RMPTD0094GEZZ	Filter	AK
				DL301	RCiLZ0082GEZZ	Delay Line	AS
				DL501	RCiLZ0125GEZZ	Delay Line	AS
				DL502	RCiLZ0142GEZZ	Delay Line	AS
				DL503	RCiLZ0149GEZZ	Delay Line	AT
TRIMMERS				MISCELLANEOUS			
C517	RT6 - H0001CEZZ	20pF, 3.58MHz APC. ADJ.	AD	X501	RCRSB0009GEZZ	Crystal	AL
C518	RT6 - H0001CEZZ	20pF, 4.43MHz APC. ADJ.	AD	X502	RCRSB0002CEZZ	Crystal	AM
				TP	QPLGN0304CEZZ	Plug (3 Pin)	AB
					QPLGN0425CEZZ	Plug (4 Pin)	AC
				CC	QPLGN0625CEZZ	Plug (6 Pin)	AC
				TP	QPLGN0646GEZZ	Plug (6 Pin)	AC
					QTANN9097GEZZ	Antenna Terminal	AR
					RTUNE0173GEZZ	Booster RF MOD.	BG
COILS AND TRANSFORMERS				PWB-E			
L201	VP - LK221K0000	220 μ H	AC	TRANSISTORS			
L202	VP - DF221K0000	220 μ H	AB	Q7701	VS2SA1347 / - 1	60Hz 9V Switch	AB
L203	VP - MK680K0000	68 μ H	AB	Q7702	VS2SA1347 / - 1	50Hz 9V Switch	AB
L204	VP - MK151K0000	150 μ H	AB	Q7703	VS2SA1347 / - 1	60Hz 9V Switch	AB
L205	VP - DF151K0000	150 μ H	AB	Q7704	VS2SA1347 / - 1	50Hz 9V Switch	AB
L301	VP - MK221K0000	220 μ H	AB	INTEGRATED CIRCUITS			
L302	VP - DF221K0000	220 μ H	AB	IC7701	VHiTC4052BP - 1	50/60Hz, Switch	AN
L303	VP - DF390K0000	39 μ H	AB	IC7702	VHiTC4053BP - 1	50/60Hz, Switch	AQ
L304	VP - DF221K0000	220 μ H	AB	CONTROLS			
L305, 306	VP - DF8R2K0000	8.2 μ H	AB	R7711	RVR - B4113GEZZ	100k ohm, Pot., 60 VS Speed	AD
L307	VP - MK151K0000	150 μ H	AB	R7712	RVR - B4113GEZZ	100k ohm, Pot., 50 VS Speed	AD
L308	VP - DF5R6K0000	5.6 μ H	AB	R7717	RVR - B4032GEZZ	22k kohm, Pot., 60 VS-R Shift	AD
L309	VP - DF390K0000	39 μ H	AB	R7718	RVR - B4032GEZZ	22k ohm, Pot., 50 VS-R Shift	AD
L310	RCiLP0002GEZZ	1mH	AC	R7719	RVR - B4032GEZZ	22k ohm, Pot., 50 VS-F Shift	AD
L311	VP - DF270K0000	27 μ H	AB	R7720	RVR - B4032GEZZ	22k ohm, Pot., 60 VS-F Shift	AD
L312	VP - DF221K0000	220 μ H	AB				
L313	VP - DF390K0000	39 μ H	AB				
L401	VP - LK221K0000	220 μ H	AC				
L402	VP - MK101K0000	100 μ H	AB				
L404	VP - MK820K0000	82 μ H	AB				
L405, 501	VP - DF221K0000	220 μ H	AB				
L502, 503	VP - MK221K0000	220 μ H	AB				
L505	VP - MK390K0000	39 μ H	AB				
L506	VP - DF221K0000	220 μ H	AB				
L507, 508, 509	VP - MK471K0000	470 μ H	AB				
L510	VP - LK101K0000	100 μ H	AB				
L511	VP - DF221K0000	220 μ H	AB				
L512	VP - DF150K0000	15 μ H	AB				
L513	VP - DF220K0000	22 μ H	AB				
L515, 516	VP - DF221K0000	220 μ H	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
R7721	RVR- M4034GEZZ	47k ohm, Pot., 60 C-Lock Shift	AE	IC3002	RH- i X0063TAZZ	ACC, APC IC.	AV
R7722	RVR- M4034GEZZ	47k ohm, Pot., 50 C-Lock Shift	AE	IC3003	VHi NJM2903D- 1	Comparator	AH
R7723	RVR- M4034GEZZ	47k ohm, Pot., 60 D-Lock Shift	AE	IC3004	VHi BA7007/ / - 1	Secam Detector	AM
R7724	RVR- M4034GEZZ	47k ohm, Pot., 50 D-Lock Shift	AE	IC3005	VHi AN6342N/ - 1	Frequency Divider	AN
R7730	RVR- B4113GEZZ	100k ohm, Pot., 50 TRA P.S.T	AD	IC3006	VHi HD14081P- 1	NAND Gate	AE
R7731	RVR- B4113GEZZ	100k ohm, Pot., 60 TRA P.S.T	AD	IC3007	VHi TC4011BP- 1	NAND Gate	AF
				IC3008	VHi TC4011BP- 1	NAND Gate	AF
				IC3009	VHi HD14069P- 1	Inverter	AE
				IC3010	VHi DT5A144/ - 1	Mode Switching	AH
PWB-F				DIODES			
TRANSISTORS				D3001	VHD1SS119/ / - 1	Diode (1SS119)	AB
Q3001	VSDTC144F/ / - 1	Switching	AB	3008			
Q3002	VSDTC144F/ / - 1	Switching	AB	D3009	RH- DX0028GEZZ	Diode	AC
Q3003	VSDTC144F/ / - 1	Switching	AB	D3010	VHD1SS119/ / - 1	Diode (1SS119)	AB
Q3004	VSDTC144F/ / - 1	Muting	AB	D3011,	RH- DX0028GEZZ	Diode	AC
Q3005	VS2SC3399/ / - 1	Muting	AB	3012			
Q3006	VS2SC945AQ/ - 1	Switching	AB	D3013	VHD1SS119/ / - 1	Diode (1SS119)	AB
Q3007	VS2SC3399/ / - 1	Switching	AB	D3014	RH- DX0028GEZZ	Diode	AC
Q3008	VS2SC945AQ/ - 1	Emitter Follower	AB	D3015,	VHD1SS119/ / - 1	Diode (1SS119)	AB
Q3009	VS2SC945APQ1E	Emitter Follower	AB	3016			
Q3010	VS2SC945APQ1E	Chroma Amplifier	AB	D3017	RH- DX0028GEZZ	Diode	AC
Q3011	VS2SC945APQ1E	Emitter Follower	AB	D3018,	VHD1SS119/ / - 1	Diode (1SS119)	AB
Q3012	VS2SC945AQ/ - 1	4.43MHz Amplifier	AB	3019,			
Q3013	VS2SA733APQ1E	Detector (PAL, Secam)	AC	3025			
Q3014	VS2SC945APQ1E	Switching	AB	3033,			
Q3015	VS2SC945APQ1E	4.43MHz Amplifier	AB	3035,			
Q3016	VS2SA733APQ1E	4.43MHz Detector	AC	3036,			
Q3017	VS2SC945AQ/ - 1	Switching	AB	3037			
Q3018	VS2SC945AQ/ - 1	3.58MHz Amplifier	AB	CAPACITOR			
Q3019	VS2SA733AQ/ - 1	3.58MHz Detector	AC	C3065	RC- EZ0020GEZZ	100 μ F, 16V, Electrolytic	AC
Q3020	VS2SC945AQ/ - 1	Switching	AB	CONTROLS			
Q3021	VS2SC1815YW1E	Switching	AB	R3005	RVR- M7168TAZZ	47k ohm, Pot., REC System DET.	AE
Q3022	VS2SC1815YW1E	Switching	AB	R3021	RVR- M7168TAZZ	47k ohm, Pot., Play Back DET.	AE
Q3023	VS2SC945AQ/ - 1	Switching	AB	TRIMMER			
Q3024	VS2SA733APQ1E	Emitter Follower	AC	C3021	RT6- H0001CEZZ	20pF, APC ADJ.	AD
Q3025	VS2SA1345/ / - 1	3.58MHz Switching	AC	COILS AND TRANSFORMERS			
Q3026	VS2SC945AQ/ - 1	Emitter Follower	AB	L3001,	VP- DF221K0000	220 μ H	AB
Q3028	VS2SC3399/ / - 1	Switching	AB	3002,			
Q3029	VS2SC945APQ1E	Switching	AB	3004			
Q3030	VS2SC945AQ/ - 1	Switching	AB	L3005	RCi LD0020GEZZ	Phase Detector	AD
Q3031	VS2SC945AQ/ - 1	Emitter Follower	AB	L3006	VP- DF221K0000	220 μ H	AB
Q3033	VS2SC945AQ/ - 1	Emitter Follower	AB	L3007	VP- DF100K0000	10 μ H	AB
Q3034	VS2SC3399/ / - 1	Switching	AB	L3008	VP- DF221K0000	220 μ H	AB
Q3035	VS2SC3399/ / - 1	Switching	AB	INTEGRATED CIRCUITS			
Q3036	VS2SC945AQ/ - 1	6MHz Emitter Follower	AB	IC3001	VHi UMPC339C- 1	Comparator	AH
Q3037	VSDTC144N/ / - 1	Color Muting	AB				
Q3038	VS2SC945AQ/ - 1	Switching	AB				
Q3039	VS2SC3399/ / - 1	3.58MHz Muting	AB				
Q3040	VS2SC945AQ/ - 1	4.5MHz Emitter Follower	AB				
Q3041	VSDTC144N/ / - 1	4.43MHz Muting	AB				
Q3042	VS2SC945APQ1E	60Hz Switching	AB				
Q3043	VSDTA144N/ / - 1	PB 60Hz Switching	AB				
Q3044	VSDTC144N/ / - 1	4.5MHz Switching	AB				
Q3045	VSDTA144N/ / - 1	Buffer	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
L3009	VP-DF270K0000	27 μ H	AB	SW8105	QSW-K0030GEZZ	Pause Still Switch	AB
L3010	VP-DF221K0000	220 μ H	AB	SW8106	QSW-K0030GEZZ	Stop Switch	AB
L3011	RCiLP0015GEZZ	8.2mH	AD	SW8107	QSW-K0030GEZZ	REC-Switch	AB
L3012	VP-DF221K0000	220 μ H	AB	SW8108	QSW-P0053GEZZ	Timer Switch	AF
L3013	RCiLP0016GEZZ	12mH	AD	SW8109	QSW-K0030GEZZ	Power Switch	AB
L3014	VP-MK221K0000	220 μ H	AB	PWB-I			
L3015	RCiLP0014GEZZ	6.8mH	AD	TRANSISTORS			
FL3001	RFiLC0017GEZZ	4.43MHz Detector	AK	Q1501	VS2SA1015Y//E	Band Switching (VHF-L ON)	AC
FL3002	RFiLC0018GEZZ	3.58MHz Detector	AK	Q1502	VS2SA1015Y/1E	Band Switching (VHF-H ON)	AC
FL3003	RFiLC0005GEZZ	4.17MHz Detector	AE	Q1503	VS2SA1015Y/1E	Band Switching (UHF ON)	AC
MISCELLANEOUS				Q1504	VS2SC1815YW-1	VT Driver	AC
X3001	RCRSB0002CEZZ	Crystal	AM	Q1505	VS2SC1815YW-1	AFT Amplifier	AC
X3002	RCRSB0002CEZZ	Crystal	AM	Q1506	VS2SC3401// -1	Switching (VHF-L ON)	AD
X3003	RCRSB0009GEZZ	Crystal	AL	Q1507	VS2SK30AG//2E	AFT Muting	AD
FA	QPLGN0546GEZZ	Plug (5 Pin)	AB	Q1508	VS2SC1815YW-1	Switching	AC
FB	QPLGN0846GEZZ	Plug (8 Pin)	AC	Q1509	VS2SC1906//1E	IF Amplifier	AC
PWB-H				Q1510	VS2SC1815YW-1	PIF SIF Sep Amplifier	AC
TRANSISTOR				Q1511	VS2SC1815YW-1	Emitter Follower	AC
Q8101	VS2SA608F//1E	Inverter	AB	Q1512	VS2SC1815YW1E	Video Amplifier	AB
INTEGRATED CIRCUITS				Q1513	VS2SA1015Y/1E	Emitter Follower	AC
IC8101	RRMCU0020GEZZ	Remote Control Receiver	AW	Q1514	VS2SC1815YW1E	Emitter Follower	AB
IC8851	RH-iX0310PAZZ	Remote Control Receiver IC.	AH	Q1515	VS2SA1015Y/1E	Switching	AC
DIODES				Q1516	VS2SA1015Y/2E	Switching	AC
D8101	RH-PX0052GEZZ	Mode LED.	AB	Q1517	VS2SC3401// -1	Switching	AD
8107				Q1518	VS2SC3401// -1	Switching	AD
D8851	RH-PX0082PAZZ	Diode	AH	Q1519	VS2SC1815YW-1	Emitter Follower	AC
CAPACITORS				Q1520	VS2SC1815YW1E	Amplifier	AB
C8853	RC-EZ0019PAZZ	100 μ F, 16V, Electrolytic	AB	Q1521	VS2SA1015Y/2E	Switching	AC
C8855	RC-EZ1106AFZZ	100 μ F, 16V, Electrolytic	AE	Q1522	VS2SC1815YW-1	Amplifier	AC
COIL				Q1523	VS2SA1015Y/2E	Switching	AC
L8851	RCiLi3537PAZZ	5mH	AE	Q1524	VS2SA1347// -1	Buffer	AB
MISCELLANEOUS				Q1525	VS2SA1347// -1	Buffer	AB
SW8101	QSW-K0030GEZZ	Eject Switch	AB	Q1526	VS2SC3401// -1	Switching	AD
SW8102	QSW-K0030GEZZ	Rewind Switch	AB	Q1527	VS2SA950Y// -1	Switching	AE
SW8103	QSW-K0030GEZZ	Play Switch	AB	Q1528	VS2SA1347// -1	Switching	AB
SW8104	QSW-K0030GEZZ	F/F Rewind Switch	AB	INTEGRATED CIRCUITS			
				IC1501	RH-iX0037CEZZ	Zener IC.	AF
				IC1502	RH-iX0113CEZZ	PIF. Amplifier Detector	AR
				IC1503	VHiTA7347P/ -1	Video switching	AG
				IC1504	VHiTA7348P/ -1	SIF Switching	AK
				IC1505	RH-iX0055GEZZ	SIF Switching	AG
				IC1506	VHiTA7061AP1E	Limiter	AH
				IC1507	VHiUPD4011B-1	NAND Gate	AE
				DIODES			
				D1501	VHD1SS119// -1	Diode (1SS119)	AB
				1534			
				CAPACITORS			
				C1516, 1536	VCEAEA1CW107M	100 μ F, 16V, Electrolytic	AC

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CONTROLS				PWB-T			
R1527 R1609	RVR- M7135TAZZ RVR- Y4118GESA	10k ohm, Pot., AGC Tuning VR.	AC AU	CAPACITORS			
				C5005 C5006	VCEAEG1CW107M VCEAEA1CW107M	100μF, 16V, Electrolytic 100μF, 16V, Electrolytic	AB AC
TRIMMERS				RESISTORS			
C1563 C1565	RT6- H1035GEZZ RT6- H1031GEZZ	20pF, SIF. DET. 4.5MHZ 50pF, SIF. DET. 4.5MHZ	AD AD	R5008 R5009 R5011	RMPTC0034GEZZ RMPTC0033GEZZ RR- XZ0037TAZZ	Packaged Circuit Packaged Circuit 4.7 ohm, 1/4W, Fuse Resistor	AC AC AB
COILS AND TRANSFORMERS				COILS AND TRANSFORMERS			
L1501 L1502 L1503, 1504, 1505 L1506, 1507 L1508 L1509, 1510 L1511 L1512 L1513 L1514 L1515 L1516 L1517 L1518 L1519 L1520 T1501 T1502 T1503 T1504 CF1501 CF1502 CF1503 CF1504 CF1505 CF1506 CF1507 CF1508 CF1509 CF1510	VP- DF150K0000 VP- DF680K0000 VP- DFR47M0000 VP- DF2R2M0000 VP- MK4R7K0000 VP- DF100K0000 VP- MK560K0000 VP- DF100K0000 VP- MK820K0000 VP- MK4R7K0000 VP- DF221K0000 VP- MK220K0000 VP- DF221K0000 VP- MK270K0000 VP- MK220K0000 VP- DF221K0000 RCiLi0371CEZZ RCiLD0096CEZZ RCiLD0097CEZZ RCiLD0012GEZZ RfiLC0010GEZZ RfiLC0020CEZZ RfiLC0023CEZZ RfiLC0013CEZZ RfiLC0001CEZZ RfiLC0007CEZZ RfiLC0015CEZZ RfiLC0001CEZZ RfiLC0015CEZZ RfiLE0002TAZZ	15μH 68μH 0.47μH 2.2μH 4.7μH 10μH 56μH 10μH 82μH 4.7μH 220μH 22μH 220μH 27μH 22μH 220μH SIF-TRAP P. DET. AFT SIF DET 6.0MHz Filter Filter Filter Filter Filter Filter Filter Filter Filter Filter	AB AB AB AB AB AB AB AB AB AB AB AB AB AB AB AB AD AE AE AE AL AE AE AE AE AE AE AE AE AE AE	L5001 X5001	VP- DF821K0000 RfiLA0001GEZZ	820μH Filter	AB AF
MISCELLANEOUS				MISCELLANEOUS			
SW1501 SW1502 IB IC ID IA	VTUVTS- 1S1Y// QSW- S0061GEZZ QSW- S0069GEZZ QPLGN0346GEZZ QPLGN0546GEZZ QPLGN0946GEZZ QPLGN1446GEZZ	Tuner AFT Switch VTR/TV/MIX Switch Plug (3 Pin) Plug (5 Pin) Plug (9 Pin) Plug (14 Pin)	BK AE AE AA AB AB AC AB	SW1401 SW1402 SW5001 SW5002 SW5003 SW5004 SW5005 SW5006 SW5007 SW5008 DG5001	QSW- P0091GEZZ QSW- P0092GEZZ QSW- S0059GEZZ QSW- K0027GEZZ QSW- K0030GEZZ QSW- K0030GEZZ QSW- K0030GEZZ QSW- K0030GEZZ QSW- K0030GEZZ QSW- K0030GEZZ VVK7BT30ZK/ - 1	Channel Selector Mode Selector Mode Selector Slow Switch Clock Switch Start Switch Length Switch Day Switch Hour Switch Minute Switch Display	AS AP AE AD AB AB AB AB AB AB AB AV
MISCELLANEOUS				TRANSISTORS			
				Q5001 Q5002 Q5003 Q5004	VS2SC2021Q/ - 1 VSDTC124F// - 1 VSDTA124F// - 1 VSDTC144F// - 1	Clock Drive Buffer Drive	AC AC AC AB
MISCELLANEOUS				INTEGRATED CIRCUIT			
				IC5001	RH- iX0097GEZZ	Timer Universal IC.	AQ
MISCELLANEOUS				DIODES			
				Q1401 1408 D1409 1420 D5001 5008 D5009	RH- PX0061GEZZ RH- PX0051GEZZ VHD1SS119// - 1 RH- EX0010GEZZ	Photo Diode Photo Diode Diode (1AA119) Zener Diode	AG AC AB AB
MISCELLANEOUS				PWB-O			
MISCELLANEOUS				CAPACITOR			
				△C9901	RC- FZ0002GEZZ	0.1μF, Noise Filter	AG

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
MISCELLANEOUS				MISCELLANEOUS			
△F9901 △	QFS - C2521GEZZ QACCV2012GEZZ	Fuse T2.5A AC Cord	AE AH	PA PD PC	QPLGN0546GEZZ QPLGN0646GEZZ QPLGN0746GEZZ	Plug (5 Pin) Plug (6 Pin) Plug (7 Pin)	AB AD AB
PWB-P				PWB-Y			
TRANSISTORS				TRANSISTORS			
Q911 Q912 Q913 Q914 Q915 Q916 Q917	VS2SC1815YW1E VS2SC1815YW1E VS2SC2655Y/- 1 VS2SC1815YW1E VS2SC1815YW1E VS2SC1815YW1E VS2SC2240BL - 1	Driver Error Amplifier AT 9V REG. Driver Error Amplifier Power Control Protector	AB AB AE AB AB AB AC	Q901 Q902	VS2SD1289PQ- 1 VS2SD1289PQ- 1	PC 12V REG. AT 13V REG.	AK AK
INTEGRATED CIRCUIT				MISCELLANEOUS			
IC911	VHi TA78009AP1	PC 9V REG.	AK	F901, 902	QFS - C1221GEZZ	Fuse T1.25A	AE
DIODES				PWB-Q			
D911 D912 D913 D914, 915, 916 D919 D921 D922 D925 D926 D927	RH- EX0019TAZZ RH- EX0023GEZZ RH- EX0048CEZZ VHD1SS119/ / - 1 RH- EX0011GEZZ VHSS6344FLB1E RH- DX0085TAZZ RH- EX0045TAZZ RH- DX0142CEZZ RH- DX0085TAZZ	Diode (RD 13EB1, 2) Diode (RD 10EB2) Diode (RD 6.2EB) Diode (1SS119) Diode (RB 15EB2) Protector Diode Diode (RD 10EB1) Diode Diode	AB AB AB AB AB AK AC AB AB AC	Q9911 Q9912 Q9913 Q9914 Q9915 Q9916 Q9917 Q9918	VS2SC2168Y/ 2E VS2SC2021Q/ - 1 VS2SC2021Q/ - 1 VS2SC1815YW- 1 VS2SA958- / / 1E VS2SC2021Q/ - 1 VS2SC2021Q/ - 1 VS2SD1055QR- 1	Kick REG. Amplifier Inverter Relay Drive VT-Regulator Schmitt Schmitt Relay Drive	AF AC AC AC AH AC AC AD
CAPACITORS				DIODES			
C913, 915, 917	RC- EZ0025GEZZ	470μF, 16V, Electrolytic	AC	D9911 D9912 D9913 D9914, 9915 D9916 D9917 D9918 D9919 D9920 D9921 D9922 D9923 D9924 D9925 D9926, 9927 D9928 D9930 D9931	RH- DX0186CEZZ RH- DX0085TAZZ RH- EX0078GEZZ VHD1SS119/ / - 1 RH- EX0046TAZZ RH- EX0024CEZZ RH- DX0038GEZZ RH- DX0039GEZZ RH- DX0085TAZZ RH- DX0085TAZZ RH- EX0020GEZZ RH- EX0023GEZZ VHD1SS119/ / - 1 RH- EX0088CEZZ VHD1SS119/ / - 1 RH- DX0142CEZZ VHD1SS119/ / - 1 RH- DX0065TAZZ	Diode (1G4B42) Diode Diode (MTZ12C) Diode (1SS119) Diode (7.5JB) Diode (RD 6.2EB) Diode Diode Diode Diode (RD 5.1EB3) Diode (RD 10EB2) Diode (1SS119) Diode (RD 7.5EB1) Diode (1SS119) Diode Diode Diode	AE AC AC AE AC AB AB AB AC AE AB AB AB AB AB AG
CONTROL				CAPACITORS			
R920	RVR- B4101GEZZ	1k ohm, Pot., ADJ.	AD	C9920 C9923	RH- EX0024GEZZ RC- EX0129TAZZ	4700μF, 50V, Electrolytic 220μF, 16V, Electrolytic	AB AC
RESISTOR							
R928	RR- XZ0023TAZZ	15k ohm, 1/2W, Protect	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE	
CONTROL				PWB-R				
R9915	RVR- M4031GEZZ	15k ohm, Pot., P. TAP H/L ADJ.	AE	DIODES				
R9930	RVR- M4026GEZZ	2.2k ohm, Pot., S. TAP L/H ADJ.		D9901 D9902	RH- DX0142CEZZ RH- EX0022TAZZ	Diode Zener Diode	AB AB	
RESISTOR				CAPACITOR				
R9911	RR- XZ0023GEZZ	22 ohm, 1/4W, Fuse-Resistor	AD	C9902	RC- FZ0002GEZZ	0.1μF, Plastic Film	AG	
TRANSFORMER				RESISTORS				
△T901	RTRNP0111GEZZ	Power Transformer	BB	△R9901 R9902	RR- DZ0001GEZZ VRS- VV3AB121J	12M ohm, Fuse Resistor 120k ohm, 1W, 5%, Metal Oxide	AD AA	
MISCELLANEOUS				MISCELLANEOUS				
TP QB QB RY9911 △F9911	QPLGN0347GEZZ QPLGN0805CEZZ QPLGN0947GEZZ RRLYU0008GEZZ QFS- C2521GEZZ	Plug (3 Pin) Plug (8 Pin) Plug (9 Pin) Relay Fuse T2.5A	AB AC AC AM AE	△RY9901 RRLYU0016GEZZ Relay				AM

CABINET PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	CPNLC1196GE01	Front Panel ASS'Y	BE	1-22	QEARP0088GEFW	Eject Earth Panel	AC
1-1	JBTN- 1379GES A	System Button	AD	1-23	GC5VA1165GES A	Remote Control	AC
1-2	JBTN- 1378GES A	Channel Button	AE			Decorate Cover	
1-3	JBTN- 1380GES A	Timer Button	AD	1-24	GMADK0010GES A	Counter Window	AB
1-4	JBTN- 1376GES A	Power Button	AG	1-25	TLABH0101GEZZ	Timer Label (A)	AA
1-5	HBDGB1057AFSA	Sharp Badge	AD	1-26	TLABH0111GEZZ	Timer Label (B)	AA
1-6	GD5RF1098GES A	Timer Door	AK	1-27	PC5VU9051GES A	Digitron Filter	AD
1-7	Hi NDP0403GES A	Timer Indication	AG	1-28	HDECQ0049GES A	Channel Decorate Panel	AD
1-8	HDECQ0048GES A	Counter Decoration	AD	1-29	GC5VA1175GES A	LED Cover	AB
1-9	Hi NDP0404GES A	Handling Indication	AH	1-30	MSPRC0057GEFJ	Timer Button Spring	AA
1-10	GMADi 0053GES A	Timer Window	AG	2	GCABA3005GESD	Upper Cabinet	AW
1-11	Hi NDP0407GES A	7 System Indication	AC	3	XHPS330P06XS0	Cup-tight Screw	AA
1-12	JBTN- 1434GES A	Counter Button	AC	4	LX- HZ3013GEFU	B Tight Screw	AB
1-13	JBTN- 1382GES A	Eject Button	AD	5	XEBSD40P16000	B Tight Screw	AA
1-14	LANGG9025GEFW	Timer Button Angle	AA	6	GBDYU3011GEZZ	Bottom Panel	AM
1-15	QEARP0084GEFW	Channel Earth Panel	AC	7	GFTAT1008GESK	Preset Tuning Control	AH
1-16	QEARP0083GEFW	System Earth Panel	AC			Cover	
1-17	XEASD30P06000	Screw	AA	8	JBTN- 1381GES A	Slow Button	AB
1-18	MSPRC0055GEFJ	Channel Button Spring	AA	9	CHLDZ1305GE01	Handling Button Ass'y	AV
1-19	MSPRC0056GEFJ	System Button Spring	AA	9-1	LHLDZ1305GES A	Handling Button Holder	AG
1-20	QEARP0085GEFW	Counter Earth Panel	AB	9-2	QEARP0086GEFW	Handling Earth Panel	AC
1-21	QEARP0087GEFW	Timer Earth Panel	AB	9-3	JBTN- 1377GES A	Handling Button	AG

MECHANICAL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	LHLDZ1309GE00	Handle LED Holder	AD	18-1	PFLT- 0034GEZZ	Foot Felt	AA
2	LHLDZ1307GE00	Channel LED Holder	AD	18-2	PSPAG0009GEZZ	Gum Spacer	AB
3	LHLDZ1308GE00	System LED Holder	AC	18-3	QEARP0053GEFW	Earth Plate	AD
4	QPWBF1151GEZZ	Servo SUB PWB	—	18-4	TCAUH3023GEZZ	RF Converter Caution Label	AA
5	LANGQ9041GEFW	Heat Sink Angle	AE	18-5	TLABS0005GEZZ	Caution Label	AB
6	QPWBF1157GEZZ	Heat Sink PWB	—	19	XHPSD30P06WS0	Cup-tight Screw	AA
7	QPWBF1153GEZZ	Regulator PWB	—	20	LANGQ9039GEFW	Power Mounting Angle (A)	AE
8	PRDAF1038GEFW	Heat Sink	AF	21	RTRNP0111GEZZ	Power Trans.	BB
9	QPWBF1263GEZZ	Audio PWB	—	22	LANGQ9040GEFW	Power Mounting Angle (B)	AF
10	LX- LZ1001GEZZ	Push Rivet	AA	23	HPNLH1002GE00	Power Panel	AH
11	LHLDW1006GEZZ	Wire Holder	AA	24	XHPSD30P06000	Cup-tight	AA
12	LHLDL1014GEZZ	Bottom Ass'y	AC	25	XBPSD30P10WS0	Cup-tight	AA
		Connecting Holder		26	XJBSD30P08000	Screw	AA
13	MHNG- 1012GEZZ	S-4 Hinge	AB	27	XJBSD30P12000	Screw	AA
14	QTANN9097GEZZ	Antenna Terminal	AR	28	XEBSD40P16000	Screw	AA
15	NSFTP0010GEZZ	Revolution Holder Pin	AC	29	TLABM0447GEZZ	Model Label	AB
16	CPNLC1206GE01	KS Preset Panel	AH	30	Hi NDP0478GEZZ	Power Display Panel	AD
16-1	Hi NDP0463GES A	AFT Indication	AC	31	PSPAH0032GE00	SW Cover	AA
16-2	Hi NDP0435GES A	Switch Indication	AD	32	LX- LZ1005GEZZ	Push Rivet	AA
17	UK5GD0001GEZZ	Adjusting Screw Driver	AB	33	KC5UB0024GEZZ	Counter	AL
18	CCABB1018GE03	Bottom Cabinet Ass'y	AZ	34	NBLTK0035GE00	Counter Belt	AB

CABINET PARTS

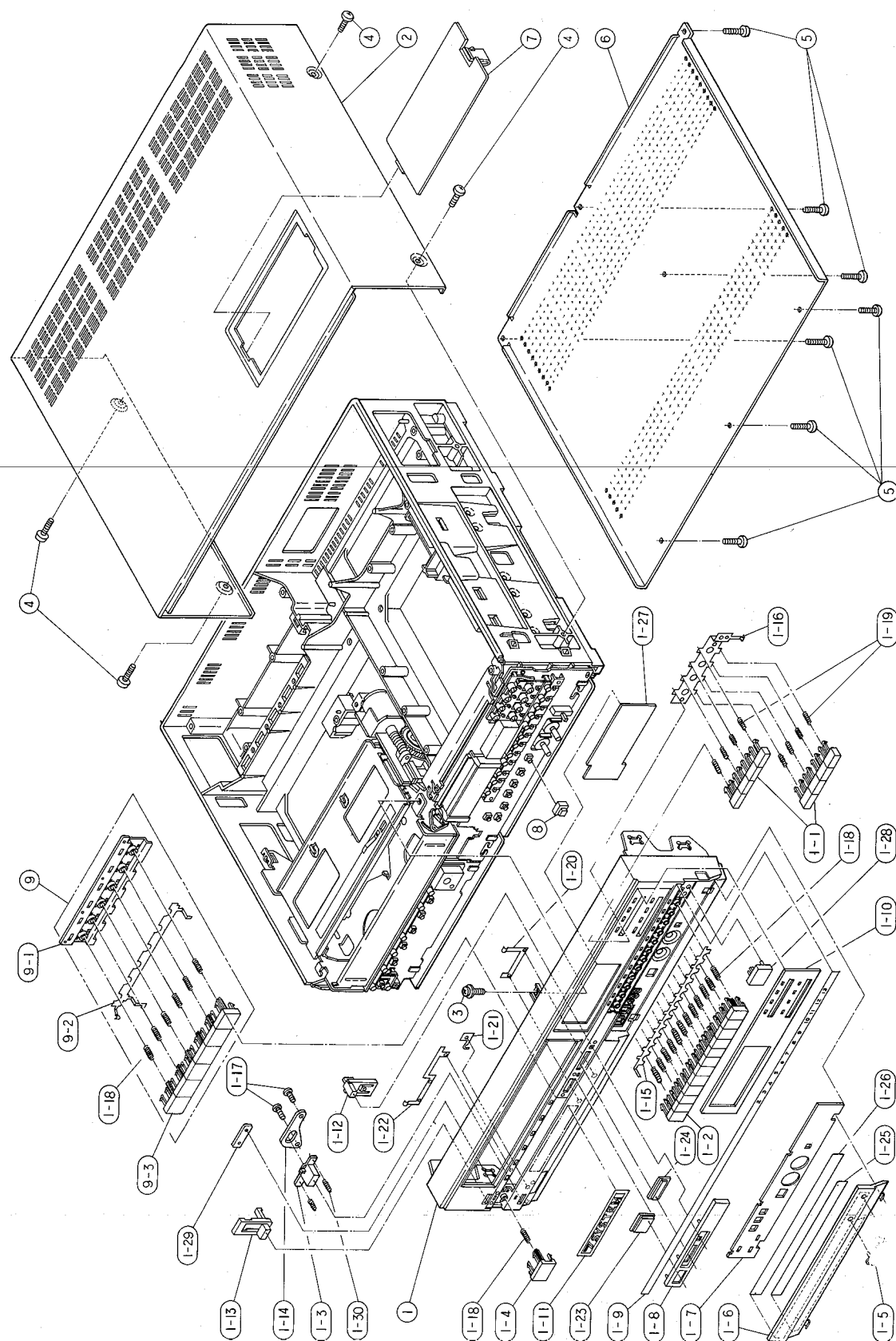


Figure 83.

MECHANICAL PARTS

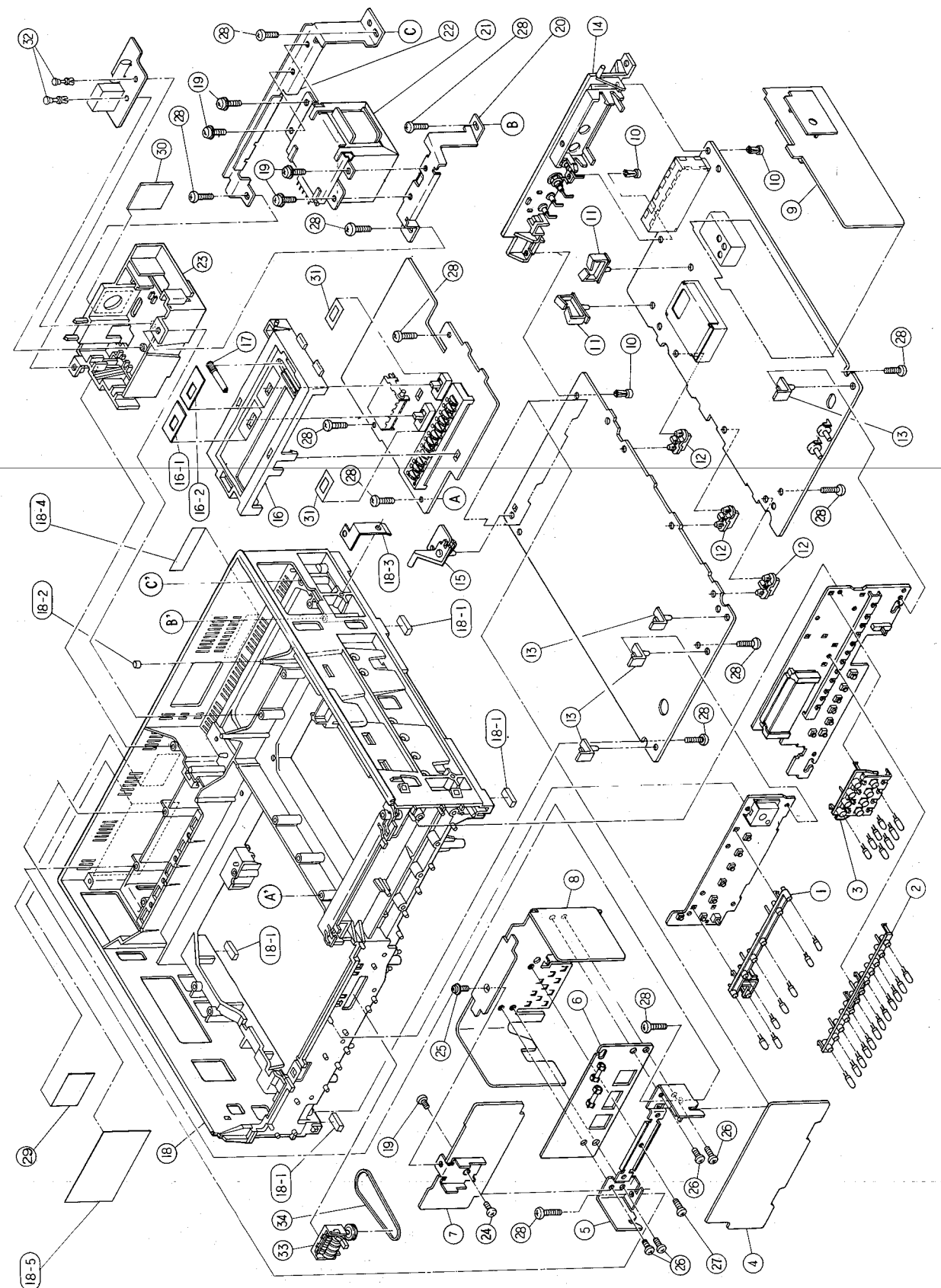


Figure 84.

MAIN CHASSIS PARTS

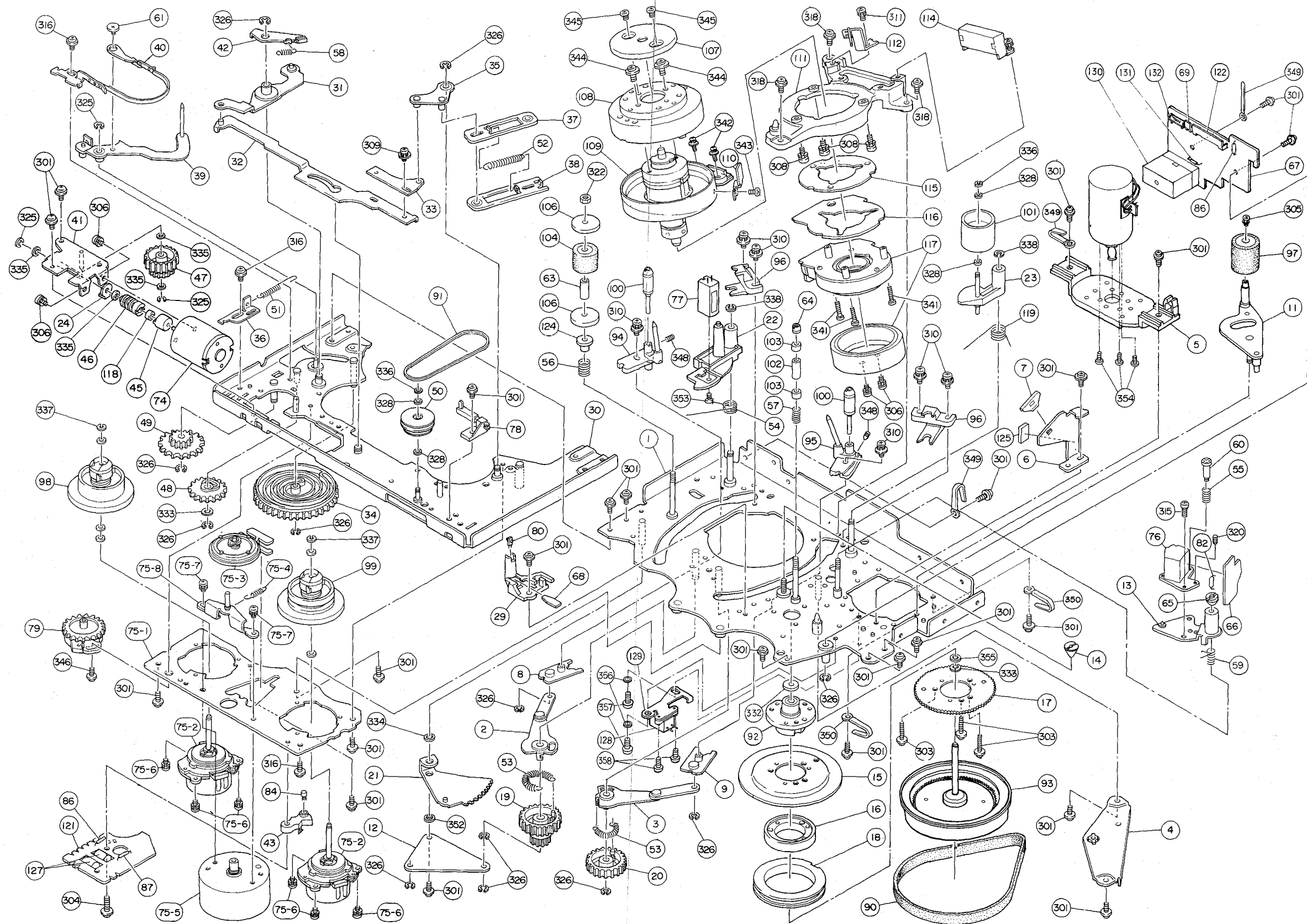


Figure 85.

MAIN CHASSIS PARTS

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	LCHSM0046GEZZ	A-Chassis Ass'y	—	67	QPWBF1102GEZZ	Mechanical Platform Base	—
2	MARMM0033GEZZ	Loading Arm A Ass'y	AF	68	QPWBF1242GEZZ	LED Platform Base	—
3	MARMM0034GEZZ	Loading Arm B Ass'y	AF	69	QPLGN0212GEZZ	Connector (2P)	AC
4	LANGF9200GEZZ	Fly wheel Angle Ass'y	AD	73	RM0TP1063GEZZ	Capstan Motor	BB
5	LANGT9075GE09	Capstan Motor Angle	AE	74	RM0TM1027GEZZ	Loading Motor	AT
6	LANGF9189GEFW	Cassette Lid Open Angle	AD	75			
7	LANGA0026GEFW	Cassette Lid Slider	AC	75-1	LCHSS0008GEFW	Reel Unit Chassis	AG
8	PGi DH0018GEZZ	Slider A Ass'y	AE	75-2	RPLU- 0068GEZZ	Reel Brake Ass'y	AQ
9	PGi DH0019GEZZ	Slider B Ass'y	AE	75-3	Ni DL- 0006GEZZ	Reel Idler Ass'y	AL
11	MLEVF0179GEZZ	Pinch Roller Lever Ass'y	AL	75-4	MSPRT0181GEFJ	Reel Idler Pressure Spring	AA
12	LANGF9122GEFW	Loading Gear Plate	AB	75-5	RM0TV1010GEZZ	Reel Motor	BA
13	MLEVF0185GEZZ	AC Head Arm Ass'y	AD	75-6	XHPSD26P 04000	Cup Tight Screw	AA
14	LX- NZ3013GEFW	Adjusting Nut	AA	75-7	XBPSD26P06J00	Pan Head Screw	AA
15	LANGQ9028GEFD	F.G. Yoke	AE	75-8	LANGF9190GEZZ	Cassette Angle Ass'y	AE
16	PSPAF0011GEFD	F.G. Spacer	AH	76	RHEDU0040GEZZ	AC Head Ass'y	AZ
17	NGERH3014GEFD	Stator Gear (142)	AG	77	RHEDT0012GEZZ	Full Erase Head Ass'y	AR
18	RSTR- 0030GEZZ	F.G. Bobbin Ass'y	AH	78	QSW- F0009GEZZ	Cassette Down SW	AD
19	NGERH3010GEZZ	Loading Gear A Ass'y	AH	79	QSW- R0010GEZZ	Mechanical Position SW	AM
20	NGERH1022GEZZ	Loading Gear B Ass'y	AD	80	RH- PX0046GEZZ	LED-S	AG
21	NGERH3005GEZZ	Segment Gear Ass'y	AE	82	VRD-RA2 EE100J	Resistor (Audio Head)	AA
22	MARMP0019GEZZ	FE Head Arm	AD	84	RH- PX0042GEZZ	Photo-Coupler	AH
23	MARMP0016GEZZ	Take-Up Impedance Roller Arm Ass'y	AD	86	VRD- RA2EE681J	Resistor (680ohm)	AA
24	NBRGR0004GEZZ	Worm Wheel	AB	87	VRD- RA2EE272J	Resistor (2.7Kohm)	AA
29	LHLDP1006GE00	LED Holder S	AB	90	NBLTH0038GE00	Capstan Belt	AE
30	LCHSM0052GEZZ	B-Chassis	—	91	NBLTK0032GE00	Counter Belt A	AB
31	MARMM0040GEZZ	Shifter Arm Ass'y	AH	92	NBRGC0018GEZZ	Capstan Holder 8347	AH
32	MSLi F0014GEZZ	Shifter Ass'y	AF	93	NFLYV0043GEZZ	Capstan Flywheel Ass'y 8638	AR
33	MLEVF0184GEFW	Shifter Adjusting Plate	AB	94	LP0LM0018GEZZ	Pole Base A Ass'y	AM
34	NGERH1043GEZZ	Master Cam	AD	95	LP0LM0019GEZZ	Pole Base B Ass'y	AM
35	MLEVF0183GEZZ	Pinch Roller Drive Lever Ass'y	AH	96	PGi DC0010GEFW	V-Block	AG
36	LANGF9167GEFW	Tension Arm Spring Angle	AB	97	NR0LR0009GEZZ	Pinch Roller Ass'y	AP
37	MLEVF0131GEFW	Pinch Roller Double Action Lever Upper	AC	98	NDAi V1023GEZZ	Supply Reel Disk Ass'y 8542	AH
38	MLEVF0132GEFW	Pinch Roller Double Action Lever, Lower	AC	99	NDAi V1018GEZZ	Take-Up Reel Disk Ass'y 8347	AK
39	MLEVF0182GEZZ	Tension Arm Ass'y	AK	100	NR0LP0024GEZZ	Guide Roller Ass'y	AL
40	LBNDK3014GEZZ	Tension Band Ass'y	AH	101	NR0LP0029GE00	Impedance Roller Ass'y	AD
41	LANGT9070GEZZ	Loading Motor Angle Ass'y	AK	102	PGi DP0001GEFW	Fixed Guide	AE
42	MLEVF0180GEZZ	Auxiliary Brake Ass'y	AC	103	PGi DP0003GEFW	Guide Flange B	AC
43	LHLDZ1193GEZZ	Reel Sensor Holder	AB	104	NR0LP0027GEZZ	SI Roller P	AH
45	NPLYV0097GEZZ	Loading Motor Pulley	AB	106	PGi DS0005GEZZ	SI Roller Flange B	AE
46	NGERW1007GEZZ	Loading Worm Ass'y	AB	107	PSLDM3440GEZZ	V.H Amp Lead Shield Case	AC
47	NGERH1041GEZZ	Worm Wheel	AB	108	DDRMU0002HE04	Upper Drum Ass'y	BS
48	NGERH1044GEZZ	Tension Arm Escape Cam	AB	109	DDRML0004HE03	Lower Drum Ass'y	BP
49	NGERH1042GEZZ	Loading Neutral Gear	AB	110	RHETP0004GEZZ	PTC Heater	AH
50	NPLYV0094GE00	Counter Platform Pulley	AB	111	PGi DC0015GEZZ	V Base Ass'y	AG
51	MSPRT0178GEFJ	Tension Arm Spring	AA	112	QBRSK0011GEZZ	Earth Brush Ass'y	AE
52	MSPRT0139GEFJ	Pinch Roller Pressure Spring	AA	114	PSLDM3438GEZZ	Shield Case	AC
53	MSPRT0140GEFJ	Double Action Spring	AA	115	PSLDM3437GEZZ	Drum Motor Shield Plate	AD
54	MSPRD0030GEFJ	Full Erase Head Arm Spring	AA	116	PZETV0124GEZZ	DD Shield-Insulator	AA
55	MSPRC0006GEFJ	Audio Control Head Spring	AA	117	RM0TP1049GEZZ	DD Motor Ass'y	BF
56	MSPRC0015GEFJ	Adjusting Spring A	AA	118	PSPAG0013GE00	Rubber Spacer	AB
57	MSPRC0016GEFJ	Adjusting Spring B	AB	119	MSPRD0029GEFJ	TI Roller Arm SPR	AA
58	MSPRT0179GEFJ	Auxiliary Brake Spring	AA	120	NBRGP0004GEZZ	Worm Bearing	AB
59	MSPRD0046GEFJ	AC Head Arm SPR	AA	121	QPWBF1280GEZZ	Mechanism Platform	—
60	LX- BZ3018GEZZ	AC Head Screw	AA	122	QPLGN1112GEZZ	Connector (11P)	AC
61	LX- BZ3026GEFD	Tension Spacer Screw	AB	124	PGi DS0010GEZZ	Guide Flange-Base	AG
63	NSFTL0215GEFW	Supply Impedance Roller, Inner	AB	125	RDTCH0010GEZZ	DEW Sensor	AG
64	LX- NZ3016GEFD	Adjusting Nut 200S	AB	127	VCE9AA1CW476M	47μF, 16V, Nonpolar	AC
65	LX- NZ3014GEFW	Adjusting Nut 388A	AA	128	RHEDZ0011GEZZ	FG-Head	AV
66	QPWBF1168GEZZ	AC Head C Base	—	129	LANGQ2007GEFD	FG-Head Base	AD
				130	RPLH- 0008GEZZ	RY-9911	AP
				131	RH- DX0142CEZZ	Diode	AB
				132	QPLGN0547GEZZ	Connector (5Pin)	AB

CASSETTE HOUSING PARTS

REF. NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
	CHLDX3019GE05	Cassette Housing	BG	24	LHLDZ1206GE00	End Sensor Holder	AC
1	LHLDX3016GEZZ	Assembly Parts	AK	25	MLEVF0186GEZZ	Timing Lever Ass'y	AB
2	LHLDZ1205GEZZ	Slider Ass'y	AC	26	MSPRD0022GEFJ	Drive Spring	AC
3	LANGF9172GEZZ	Motor Holder Ass'y	AC	27	MSPRD0047GEFJ	Drive Prevention Lever	AB
4	LANGF9173GEZZ	Frame Right Ass'y	AK			Spring	
5	LANGF9174GEFW	Frame Left Ass'y	AK	28	MSPRT0180GEFJ	Cassette Control Lid	AB
6	LANGF9175GEFW	Top Panel	AE			Arm Spring	
7	LANGF9175GEFW	Down Guide	AD	29	MSPRT0182GEFJ	Drive Gear Double-	AB
8	HDECA0032GES C	Cassette Control Lid	AK			acting Spring	
9	NGERH1045GEZZ	Drive Gear (Right)	AC	30	MARMM0022GEFD	Drive Spring Washer	AG
10	NGERH1046GEZZ	Drive Gear (Left)	AC	31	RMOTM1029GEZZ	Loading Motor	AQ
11	MARMM0041GEFW	Drive Arm	AE	32	QPWBF0906GEZZ	Relay Substrate	—
12	NSFTD0003GEFD	Main Shaft	AF	33	QPWBF0969GEZZ	End Sensor Plate	—
13	NGERH1047GEZZ	Phase Gear	AC	34	QSW- F0010GEZZ	Cassette Switch (Leaf)	AD
14	NPLYV0089GEZZ	Motor Pulley	AB	35	QSW- F0011GEZZ	Mode Switch (Leaf)	AD
15	NGERW1008GEZZ	Worm	AE	36	QSW- F0012GEZZ	Misereasure Prevention	AD
16	NGERW1009GEZZ	Worm Wheel	AE			Switch (Leaf)	
17	NGERH1048GEZZ	Main Drive Gear	AD	38	PGUMM0027GEZZ	Cassette Control Lid	AA
18	MARMP0023GEZZ	Arm A for Cassette	AC			Vibration Prevention	
		Control Lid		39	PGUMM0028GEZZ	Rubber	
19	MARMP0024GEZZ	Arm A for Cassette	AC	42	RH- PX0053GEZZ	Sound Insulation Felt	AB
20	MLEVP0058GE00	Control Lid	AC	43	VRD- RA2EE153J	Photo Transistor	AF
21	PGi DM0029GE00	D Prevention Lever	AC	44	VS2SA937- Q/ - 1	Resistor (15kohm)	AA
22	PGi DM0030GE00	Fixed Guide (Right)	AB	51	QPLGN1012GEZZ	Transistor	AC
23	PGi DM0031GEZZ	Fixed Guide (Left)	AB	52	XWHJ Z21- 05045	Connector (10 pin)	AC
		Slide Guide	AF	53	QEARP0072GEFW	Polyslider Washer	AA
		Slide Guide Bush	AB			Cassette Control	AB
						Ground Spring	

CASSETTE HOUSING PARTS

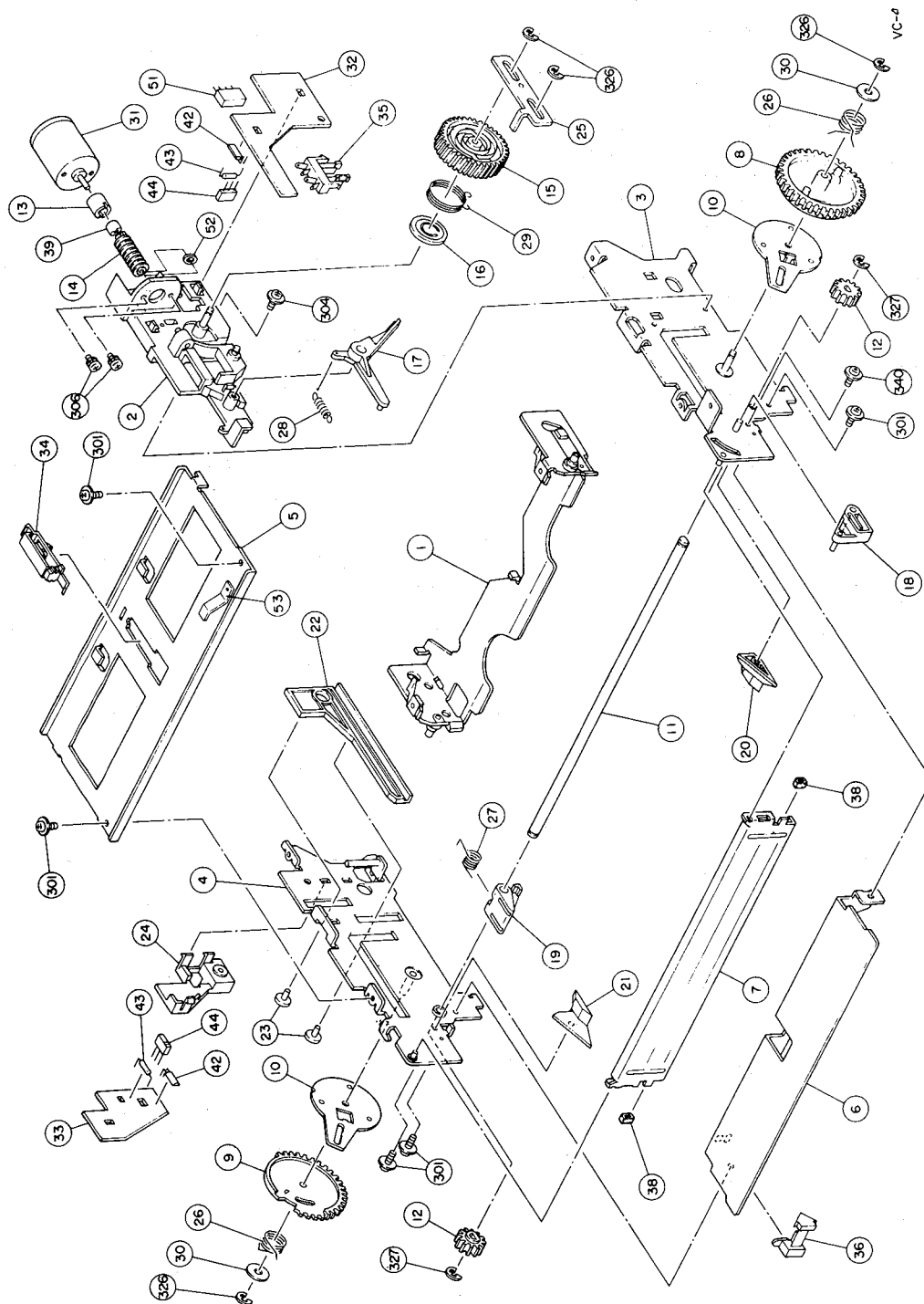


Figure 86.

SCREW, NUTS, WASHERS, AND WIRE CLAMP

REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE	REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE
301	XHPSD30P06WS0	Cup Tight Screw	C3P+6S	AA	332	XWHJ Z34- 05054	Polyslider Washer	3.45W10-0.5	AA
303	XHPSD30P16WS0	Cup Tight Screw	C3P+16S	AA	333	XWHJ Z42- 05070	Polyslider Washer	4.2W7-0.5	AA
304	XHPSD30P12WS0	Cup Tight Screw	C3P+12S	AA	334	XWHJ Z52- 05080	Polyslider Washer	5.2W8-0.5	AB
305	XBPSD26P04J00	Pan Head Screw	SW2.6P+4S	AA	335	XWHJ Z31- 05054	Polyslider Washer	3.1W5.4-0.5	AA
306	XBPSD30P05J00	Pan Head Screw	SW3P+5S	AA	336	LX- WZ1005GE00	Polyslider Washer with Cut	1.6W4-0.5	AA
307	XBPSD30P04J00	Pan Head Screw	SW3P+4S	AA	337	LX- WZ1006GE00	Polyslider Washer with Cut	2.5W5.4-0.5t	AA
308	XBPSD30P08J00	Pan Head Screw	SW3P+8S	AA	338	LX- WZ1007GE00	Polyslider Washer with Cut	3.0W5.4-0.5	AA
309	XBPSD30P05J00	Pan Head Screw	WSW3P+5S	AA	341	LX- BZ3047GEFD	Screw	WSW3P+10S	AA
310	XBPSD30P08J00	Pan Head Screw	WSW3P+8S	AA	342	XBPSD30P10JS0	Screw	SW3P+4S	AA
311	XBPSD30P06J00	Pan Head Screw	SW3P+6S	AA	343	XBPSD30P04J00	Screw		AA
312	XBPSD20P10000	Screw	2P+10S	AA	344	LX- BZ3039GEFN	Screw		AA
315	XBPSD30P08000	Screw	3P+8S	AA	345	XBPN30P04000	Screw		AA
316	LX- HZ3012GEFD	Screw with Washer	W3P+6S	AA	346	LX- HZ3007GEFD	Screw with Washer	W3P+10S	AA
318	LX- HZ3008GEFD	Screw with Washer		AA	347	LX- HZ3014GEFD	Screw	WSW3P+8S	AA
320	LX- XZ3013GEFP	Fixing Screw	M3x5	AA	348	LX- XZ3001GEFD	Fixing Screw	M2x3	AC
322	XNESD30- 02000	Nut	M3	AA	349	LHLDW1019GEZZ	Wire Holder (Small)		AA
323	LHLDW1043GE00	Clamp		AA	350	LHLDW9003GEZZ	Wire Holder		AA
325	XRESJ25- 04000	E Ring	E2.5	AA	352	XWHJ Z52- 15090	Polyslider Washer	5.2W9.0-1.5	AB
326	XRESJ30- 06000	E Ring	E3	AA	353	XBPSD20P03000	Screw	2P+3S	AA
327	XRESJ40- 06000	E Ring	E4	AA	354	XBPSD20P00J00	Screw		AA
328	XWHJ Z21- 05045	Polyslider Washer	2.1W4.5-0.5	AA	355	XWHJ Z42- 02070	Polyslider Washer	4.2W7-0.25	AA
329	XWHJ Z31- 01044	Polyslider Washer	3.1W4.4-0.13	AA					
330	XWHJ Z31- 02044	Polyslider Washer	3.1W4.4-0.25	AA					
331	XWHJ Z31- 05044	Polyslider Washer	3.1W4.4-0.5	AA					